

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.

IPR2024-01186
Patent 10,574,894 B2

Before WILLIAM V. SAINDON, NABEEL U. KHAN, and
BRIAN D. RANGE, *Administrative Patent Judges*.

RANGE, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Arashi Vision (U.S.) LLC (d/b/a Insta360) (“Petitioner”) filed a Petition requesting *inter partes* review of claims 1–20 of U.S. Patent No. 10,574,894 B2 (Ex. 1001, “the ’894 patent”). Paper 2 (“Pet.”). GoPro, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”).

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless the information presented in the petition “shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” The following findings of fact and conclusions of law are not final, but are made for the sole purpose of determining whether Petitioner meets the threshold for initiating review. Any final decision shall be based on the full trial record, including any response timely filed by Patent Owner. Any arguments not raised by Patent Owner in a timely-filed response may be deemed waived.

For the reasons stated below, we determine that Petitioner has established a reasonable likelihood that it would prevail with respect to at least one claim. We hereby institute an *inter partes* review as to claims 1–20 of the ’894 patent based upon Petitioner’s asserted grounds of unpatentability.

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner identifies Arashi Vision Inc. (d/b/a Insta360) as the real party in interest. Pet. 74. Patent Owner identifies itself as the real party in interest. Paper 4, 2.

B. Related Matters

The parties identify the following matters as related to this proceeding:

1. *In the Matter of Certain Cameras, Camera Systems, and Accessories Used Therewith*, Inv. No. 337-TA-1400 (USITC)
2. *GoPro, Inc. v. Arashi Vision Inc.*, No. 8:24-cv-00681-HDE-JCV (C.D. Cal.)
3. *Arashi Vision Inc. v. GoPro, Inc.*, IPR2024-00984
4. *Arashi Vision Inc. v. GoPro, Inc.*, IPR2024-01052
5. *Arashi Vision Inc. v. GoPro, Inc.*, IPR2024-01164
6. *Arashi Vision Inc. v. GoPro, Inc.*, IPR2024-01165

Pet. 74–75; Paper 4, 2.

C. The '894 patent (Ex. 1001)

The '894 patent is titled “Systems and Methods for Stabilizing Videos” and relates to “stabilizing videos” so as to not appear “jerky/shaky” despite “motion of the image capture device during the capture.” *Id.* at 1:6–18. “Stabilization of such videos . . . us[es] smaller visual content portions of the images to provide a punch-out view of the images that creates a more stable view than when generating videos by using the entire visual content of the images.” *Id.* at 8:2–6. Generally, “[a]n observed trajectory of the image capture device reflects the positions of the image capture device at different moments.” *Id.* at code (57). “A capture trajectory of the image capture device . . . is determined based on a subsequent portion of the observed trajectory.” *Id.* “Orientations of punch-outs for the images are determined based on the capture trajectory.” *Id.*

Figures 6A and 6B, reproduced below with Figure 6A at respectively top and Figure 6B at bottom-left and bottom-right, each illustrate an optical field of view and capture field of view for each of three video images captured by a different orientation of the image capturing device; i.e., each captured at different moments. *Id.* at 12:3–5, 13:18–22, 13:28–31.

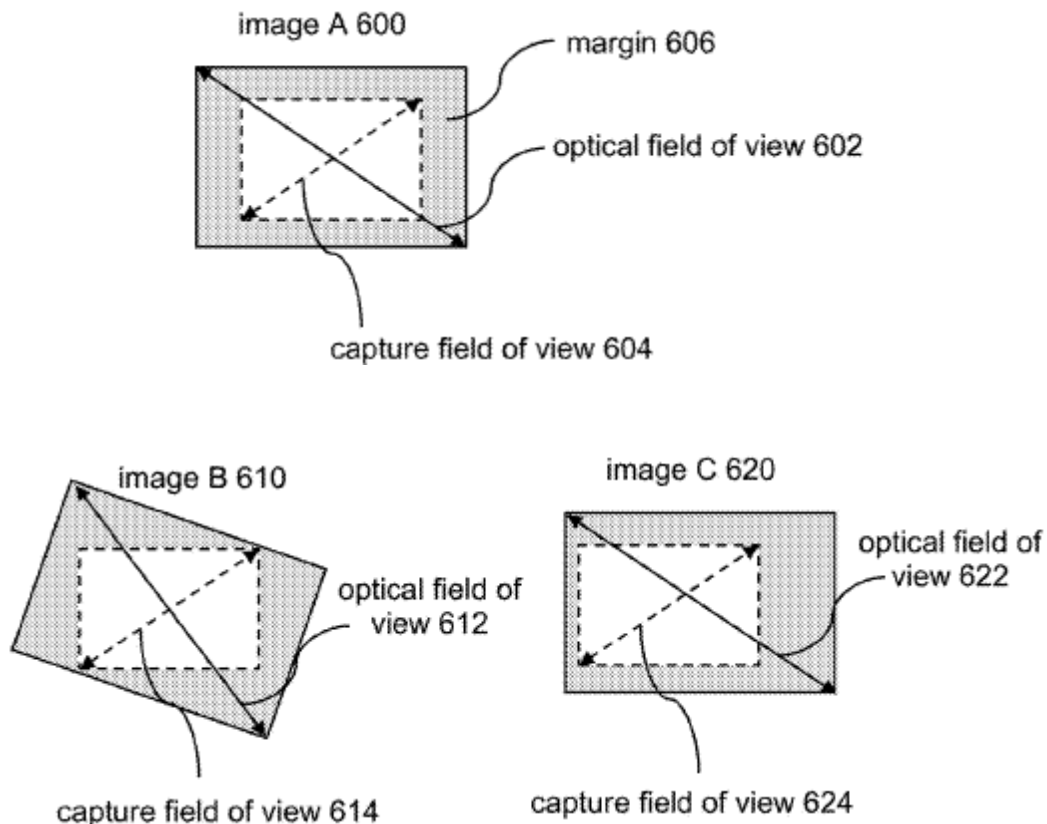


Figure 6A (at top) “illustrates example optical field of view and capture field of view.” *Id.* at 3:29–30. Figure 6B (at bottom left and bottom right) “illustrates example orientations of a capture field of view with respect to an optical field of view.” *Id.* at 3:31–32. As shown, the optical field of view 602, 612, 622 is the image captured by the image capture device. *Id.* at 1:18–20. The capture field of view 604, 614, 624 is the image cropped (i.e., punch-out from the optical field of view 602, 612, 622) and displayed to maintain a video stabilized to the capture trajectory intended by the user of

the image capture device as opposed to the observed actual trajectory. *Id.* at 1:24–46. In addition to illustrating orientation of the capture field of view 604, 614, 624 to stabilize the video (based on the capture trajectory), Figures 6A and 6B illustrate that the orientation of the capture field of view 604, 614, 624 is restricted by the margin 606 and particularly the correspondingly permitted disparity of orientation between the capture field of view 604, 614, 624 and respective optical field of view 602, 612, 622. *Id.* at 12:3–22.

Figure 5C, reproduced below, illustrates a determination of whether to regard the observed trajectory (i.e., actual) as being the capture trajectory (i.e., intended by the user). *Id.* at 10:11–23.

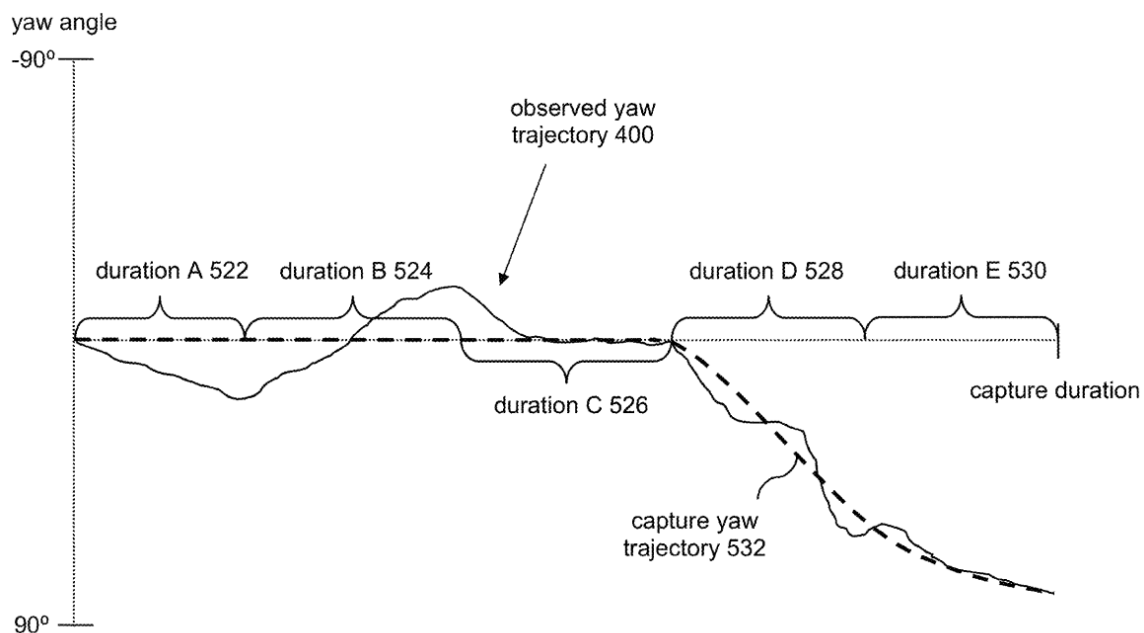


Figure 5C “illustrates an example capture trajectory.” *Id.* at 3:28. “The observed trajectory [is] an observed yaw trajectory 400 of the image capture device” and “reflect[s] yaw angle positions (e.g., rotational positions defined with respect to a yaw axis, rotation to the left or right) . . . of the image capture device at different moments within the capture duration.” *Id.* at 7:39–45. Here, a first duration A 522 (of the yaw angle over time) is

ascribed from the start of imaging to the first significant change in the observed yaw trajectory 400 (e.g., a threshold change in the magnitude and/or sign (plus or minus) of the yaw angle). *Id.* at 8:19–53 (describing durations A 502, B 504 of Figure 5A). A second duration B 524 is ascribed from the end of the first duration A 522 to the next (second) significant change in the observed yaw trajectory 400. *Id.* And, subsequent durations C 526, D 528, E 530 are likewise ascribed. *Id.* at Fig. 5C.

“The capture trajectory [is] a capture yaw trajectory 532” and “reflect[s] yaw angle positions 15 . . . of the image capture device to be used in determining which portions of the visual content of the images (punch-outs) may be used to generate a video.” *Id.* at 10:12–19. “The capture yaw trajectory 532 [is] determined such that [each] portion . . . is determined based on a subsequent portion of the observed yaw trajectory 400.” *Id.* at 10:26–30. Here, the capture yaw trajectory 532 for the first duration A 522 is based on the observed yaw trajectory 400 of the next two durations B 524, C 526 and indicates that the change of yaw angle ending the first duration A 522 was unintended (i.e., undesired by the user of the image capture device). *Id.* at 10:30–44. The determination is that the two changes of yaw angle respectively ending the first and second durations A 522, B 524 represent the user unintentionally rotating the image capture device to the right, overly correcting by overly rotating the device to the left, and then correcting by properly rotating the device to the right (stopping at a yaw angle of 0 midway through duration C 526). *Id.* at 10:44–52. A similar determination is made that durations 528, 530 show an intended continuous rotation to the right (overall slope of observed yaw trajectory 400 included by capture yaw trajectory 532) and concurrent unintended rotations

(staggering of the observed yaw trajectory 400 omitted by capture yaw trajectory 532). *Id.* at 10:52–59.

D. Illustrative Claims

Claims 1 and 11 are independent. *See* Ex. 1001, 17:49–18:45. The other challenged claims 2–10 and 12–20 respectively depend from claims 1 and 11. *Id.*

Claim 1 is illustrative and is reproduced below (with Petitioner’s identifiers of claim elements, *see, e.g.*, Pet. 10–38).

1. [Preamble] A system that stabilizes videos, the system comprising:

[a] a housing of an image capture device;

[b][i] an optical element carried by the housing and configured to guide light within an optical field of view to an image sensor, [b][ii] the optical field of view being greater than a capture field of view for generating video content;

[c][i] the image sensor carried by the housing and configured to generate an image output signal based on light that becomes incident thereon during a capture duration, [c][ii] the image output signal conveying image information that defines images with the optical field of view;

[d][i] a position sensor carried by the housing and configured to generate a position output signal based on positions of the housing during the capture duration, [d][ii] the position output signal conveying position information that characterizes the positions of the housing at different moments within the capture duration, the positions of the housing including rotational positions of the housing; and

[e] one or more physical processors configured by machine-readable instructions to:

[f][i] determine an observed trajectory of the housing during the capture duration based on the position information, the observed trajectory reflecting the positions of the housing at

the different moments within the capture duration, [f][ii] the observed trajectory including a first portion corresponding to a first moment within the capture duration and a second portion corresponding to a second moment subsequent to the first moment within the capture duration;

[g][i] determine a capture trajectory of the housing based on a look ahead of the observed trajectory, [g][ii] the capture trajectory reflecting actual and/or virtual positions of the housing from which orientations of the capture field of view with respect to the optical field of view of the images are determined, [g][iii] the look ahead of the observed trajectory including use of a subsequent portion of the observed trajectory to determine a preceding portion of the capture trajectory such that a portion of the capture trajectory corresponding to the first portion of the observed trajectory, which corresponds to the first moment within the capture duration, is determined based on the second portion of the observed trajectory, which corresponds to the second moment within the capture duration, [g][iv] the capture trajectory having smoother changes than the observed trajectory, [g][v] wherein the capture trajectory is determined to include a path that minimizes a combination of rotational velocity and rotational acceleration of the housing, [g][vi] the combination of the rotational velocity and the rotational acceleration of the housing weighing the rotational velocity and the rotational acceleration equally or differently;

[h] determine the orientations of the capture field of view for the images with respect to the optical field of view of the images based on the capture trajectory of the housing; and

[i][i] generate the video content based on a punch-out of visual content of the images within the capture field of view, [i][ii] wherein use of the visual content of the images within the capture field of view to generate the video content provides stabilization that creates a more stable view than use of entire visual content of the images.

Ex. 1001, 17:49–18:45.

E. Asserted Grounds of Unpatentability

Petitioner, supported by the declaration of Dr. Aggelos Katsaggelos (Ex. 1002), asserts the following grounds of unpatentability (Pet. 8):

Claims Challenged	35 U.S.C. §	References/Basis
1–20	103	Zhou, ¹ Kwatra ²
2, 3, 7, 12, 13, 17	103	Zhou, Kwatra, Shi ³

Patent Owner disputes the grounds and supports its position with the declaration of Dr. Hassan Foroosh. Prelim. Resp., *passim* (citing Ex. 2001).

III. ANALYSIS OF PETITIONER’S GROUNDS

A. Legal Standard

A patent claim is unpatentable under 35 U.S.C. § 103 “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” 35 U.S.C. § 103; *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness.⁴ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

¹ US 9,674,438 B2, issued June 16, 2017, Ex. 1004.

² US 8,531,535 B2, issued September 10, 2013, Ex. 1005.

³ US 10,462,370 B2, issued October 29, 2019, Ex. 1006.

⁴ Patent Owner asserts objective evidence of nonobviousness. Prelim. Resp. 19–27.

B. Level of Ordinary Skill in the Art

In order to determine whether an invention would have been obvious at the time the application was filed, we consider the level of ordinary skill in the pertinent art at the critical time. *Graham*, 383 U.S. at 17. The resolution of this question is important because it allows us to “maintain[] objectivity in the obviousness inquiry.” *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991). In assessing the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (quotation omitted). Generally, it is easier to establish obviousness under a higher level of ordinary skill in the art. *Innovation Toys, LLC v. MGA Entm’t, Inc.*, 637 F.3d 1314, 1323 (Fed. Cir. 2011) (“A less sophisticated level of skill generally favors a determination of nonobviousness . . . while a higher level of skill favors the reverse.”).

Petitioner contends that a person of ordinary skill in the art (POSITA) would have the following characteristics: “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.” Pet. 6 (citing Ex. 1002 ¶¶ 36–37). Petitioner states that, “[a]lternatively, a POSITA would have four years of experience working on image or video processing or digital cameras.” *Id.* Petitioner further contends “[a]n advanced graduate degree in the disciplines cited above may make up for the work experience

indicated above.” *Id.* Patent Owner does not dispute the level of ordinary skill in the art. Prelim Resp. 3.

For purposes of this Decision, we adopt Petitioner’s proposal as reasonable and consistent with the ’894 patent specification and the prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art may reflect an appropriate level of skill in the art).

C. Claim Construction

In *inter partes* reviews, the Board interprets claim language using the district-court-type standard, as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1313–14. Although extrinsic evidence, when available, may also be useful when construing claim terms under this standard, extrinsic evidence should be considered in the context of the intrinsic evidence. *See id.* at 1317–19.

Petitioner “does not believe any terms require a formal construction.” Pet. 6. Patent Owner agrees “no claim terms presently require construction.” Prelim. Resp. 11–12.

We do not discern a need to construe explicitly any claim language at this juncture because doing so would have no effect on our analyses below of Petitioner’s asserted grounds and will not assist in resolving the present controversy between the parties. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve

the controversy.’’)) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

D. Overview of the Asserted Art

1. Zhou (Exhibit 1004)

Zhou relates to “the field of digital photography” and particularly “improved stabilization of video frames captured in low light conditions by taking into account motion blur within the video frames.” *Id.* at 1:13–17. “Motion blur” is streaking of pixels in an image due to concurrent rapid movement and long exposure (i.e., a long integration time)⁵ of the image capture device. *Id.* at 1:49–55; *see also* Ex. 1002 ¶ 162. Motion blur is generally increased by the longer exposure of an image capture device during low light conditions. Ex. 1004 at 1:56–61.

Zhou’s technique “to more effectively stabilize low light video in real-time (i.e., as it is captured)” includes “using an ‘overscan’ region and a look-ahead buffer comprising a number of video input frames” (*id.* at 2:59–64) to “estimat[e] the amount of motion blur in ‘future’ and ‘past’ motion data” and perform “stabilization adjustments (the movement of individual frames within their overscan) of a current frame . . . using motion data from either or both of ‘past’ and ‘future’ frames” (*id.* at 3:4–6). The adjustment includes “adjust[ing] or modulat[ing] the strength of a video stabilization metric value.” *Id.* at 3:7–8. “A stabilization strength value may be thought of as a value used, in part, to determine a weighting or correction factor used to moderate movement of an image within its overscan region during stabilization operations.” *Id.* at 5:11–14.

⁵ We take official notice that integration time of an image is the duration that the image sensing substrate senses light to generate the image.

“One approach to video stabilization that makes use of a tunable video stabilization strength value is to first determine what sort of activity is causing the detected camera motion, set the tuning value accordingly, and stabilize in accordance with that value . . . [; e.g.,] if no motion is detected, . . . classify the ‘type of motion’ as stationary and . . . apply very strict stabilization.” *Id.* at 3:47–53. “One approach [of Zhou] . . . monitors the motion of each frame, . . . buffer[s] some number of incoming video frames, delay[s] the production of stabilized video output frames by the time required to capture these frames, . . . [and thus] permits a ‘current frame’ to use both ‘future’ and ‘past’ motion data[, and], in turn, permits stabilization adjustments (the movement of individual frames within their overscan) of a current frame in a way that . . . anticipates[] the motion in future frames.” *Id.* at 3:59–4:4.

Figure 2B of Zhou is a block diagram illustrating a frame buffer system. *Id.* at 2:40–41.

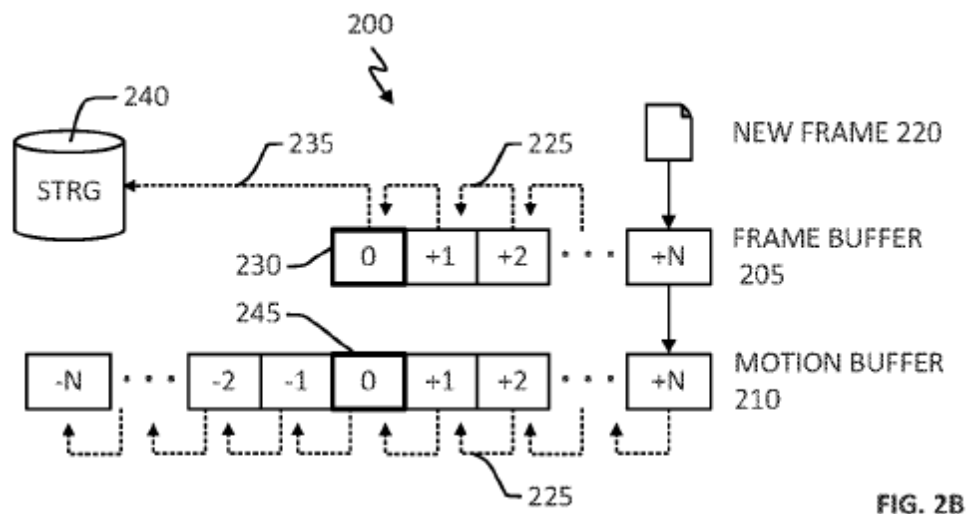


Figure 2B “show[s], in block diagram form, a frame buffer system” in accordance with a Zhou embodiment. *Id.* at 2:40–41. Here, “image data and motion data . . . [is] buffered for a specified number of frames before a first

stabilized output frame is generated.” *Id.* at 4:24–29. The “buffer system 200 . . . includes (N+1) entry frame buffer 205[] and (2N+1) entry motion buffer 210” (*id.* at 4:30–32); N images being captured before (negative N) and after (positive N) the frame 0 currently being stabilized (*id.* at 4:47–56), i.e., “current frame” 0 stored at the frame entry 230 and motion entry 245 (*id.* at 4:48–49, 5:8–11).

As each frame arrives, “it is placed into the +Nth frame buffer entry with the frame’s corresponding motion data placed into the +Nth motion buffer entry.” *Id.* at 4:32–34. “[E]very entry already in frame buffer 205 and every entry in motion buffer 210 may be shifted to the left by one position as indicated by dotted lines 225.” *Id.* at 4:39–42. “After being stabilized, frames shifted out of frame buffer entry 230 (the 0th entry) may be routed 235 to long-term storage 240” and “[m]otion data shifted out of motion buffer entry 245 (the 0th entry) may be discarded or retained.” *Id.* at 4:42–46.

Using the above frames, Zhou calculates an “image blur vector” from the following data: starting and ending integration times; camera orientation and rotation at the start and end of integration; and camera lens position. *Id.* at 5:30–53. Operation proceeds to calculating “a target max stabilization strength value for the current image.” *Id.* at 6:38–40. “[I]f the amount of blur in the image is smaller (typically found in brighter images with shorter integration times), larger stabilization strengths may be employed” *Id.* at 6:41–44. “[I]f the amount of blur in the image is larger (typically found in darker images with longer integration times), smaller stabilization strengths may be employed” *Id.* at 6:46–48.

Figure 3 of Zhou illustrates the resulting stabilization movement that can be applied to a visible region of a frame within its overscan. *Id.* at 2:42–44.

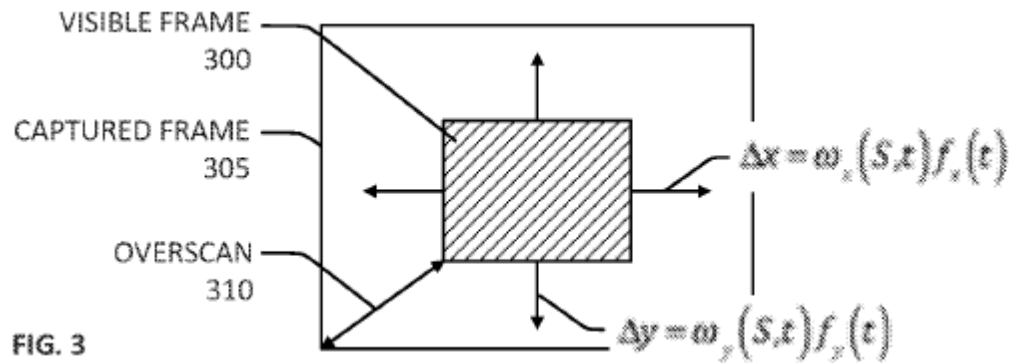


Figure 3 “illustrates the movement that can be applied to a visible region of a frame within its overscan during stabilization operations” in accordance with Zhou. *Id.* at 2:42–44. Here, the movement constitutes translational motion of visible frame 300 within captured frame 305, i.e., within their difference constituting overscan 310, “where Δx and Δy represent the amount of motion along x and y coordinate axes that the current frame should be moved in accordance with stabilization operation 100, $\omega_x()$ and $\omega_y()$ represent x and y coordinate weighting functions 35 respectively, and functions $f_x()$ and $f_y()$ represent arbitrary movement functions (linear or non-linear) that are up to the discretion of the designer.” *Id.* at 7:24–38. Though the Δx and Δy equations “describe translation only[,] actual correction may include other axes and other artifacts[, e.g.,] . . . using gyroscope output (represented as quaternions) against rotation, perspective distortion and rolling shutter artifacts.” *Id.* at 7:38–43. “For a given stabilization strength S (as optionally limited by the calculated ‘target max strength’ for the current frame . . .), a frame’s Δx and Δy values are simply functions of time (e.g., motion buffer entry index) . . .” *Id.* at 8:7–11. “[A]

test may be made to determine if the current frame remains within its overscan” *Id.* at 8:26–28. “The remaining actions . . . seek to predict if the current frame’s future frames will fit in their overscan using the same strength parameter[and, a]s long as the current stabilization strength value is found to do this, that value is used.” *Id.* at 8:32–36. “When one of the current frame’s future frames does not fit in its overscan, the stabilization strength value may be lowered until a value is found that predicts it will fit.” *Id.* at 8:36–40.

We reproduce Figure 6 of Zhou below.

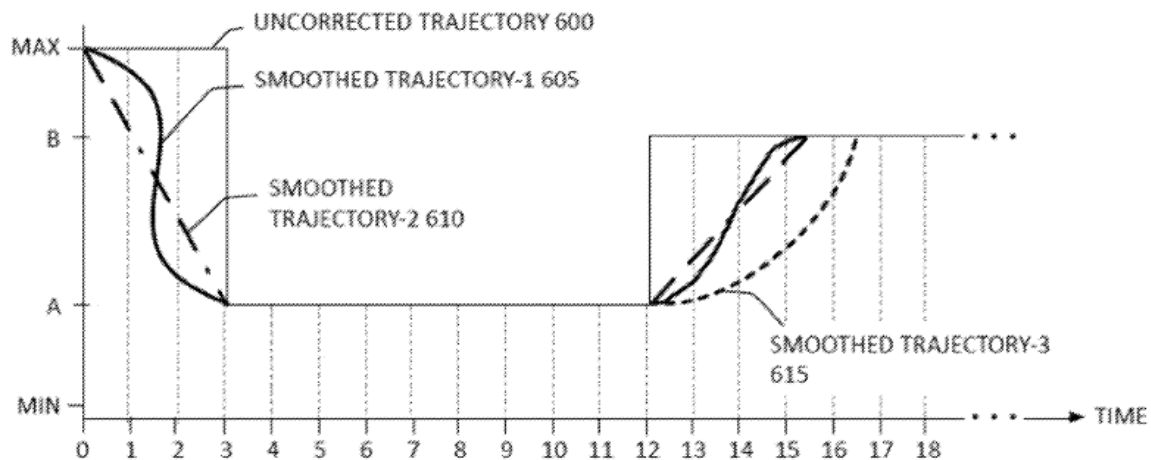


Figure 6 shows, in accordance with a Zhou embodiment, “illustrative stabilization strength trajectories.” *Id.* at 2:52–53. “[W]hen the future frame necessitating the change in stabilization strength values becomes the ‘current frame,’ the stabilization strength value will have gradually and smoothly reached its new target value, thus avoiding any abrupt or jarring changes in the stabilization strength value or the resulting stabilized video.” *Id.* at 8:46–52. “Uncorrected trajectory 600 represents . . . abrupt changes in stabilization strength at t=3 and 12 (necessitated by motion of the image capture device . . .) [that] may cause a visual flicker, jump, or other

discontinuity during video stream playback.” *Id.* at 10:19–27. [E]ach of smooth trajectory 1 605 and smooth trajectory 2 610 represent but two possible smoothed trajectories” *Id.* at 10:28–30. “[A]ny smoothing function that changes the stabilization strength value over time so as to result in a smoothened frame-to-frame adjustment of video images that meets the needs or goals of the system under design may be used, e.g., a linear function, an exponential function, a parabolic function, a quadratic function, a stair step function, etc.” *Id.* at 10:57–63. The process likewise “increase[s] the stabilization strength slowly, resulting in a more gradually corrected trajectory, . . . in smoothed trajectory-3 615.” *Id.* at 11:16–19.

2. *Kwatra (Exhibit 1005)*

Kwatra relates to “processing a video for stabilization and retargeting.” *Id.* at 1:45–46. Kwatra summarizes the processing as follows (in part):

[P]rocessing a video . . . may comprise[:] estimating an original motion path of a camera that recorded a video[;] . . . determining[,] at each time t[,] a substantially constant path, a substantially constant velocity, or a substantially constant acceleration of the original motion path of the camera[;] . . . determining a modified motion camera path of the original motion path of the camera including[,] for each time t[,] the substantially constant path, the substantially constant velocity, or the substantially constant acceleration of the original motion path of the camera[; and] . . . based on the modified motion camera path and the original motion path of the camera, determining a crop window transform that describes how to modify the original motion path of the camera to the modified motion camera path

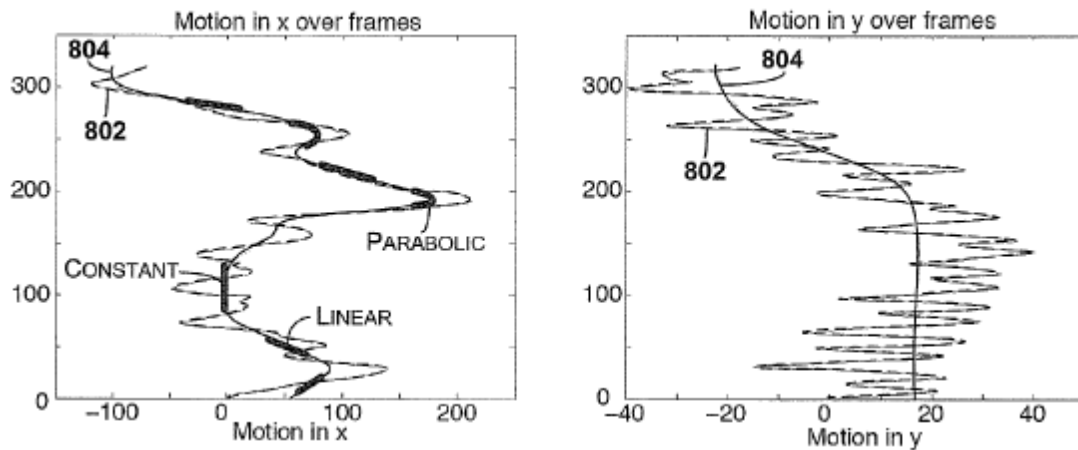
Id. at 1:46–61. Kwatra describes example aspects as follows:

The video may be processed to estimate an original path (e.g., motion) of a camera that recorded the video, to estimate a

new steady/smooth camera path, and to recast the video from the original path to the smooth camera path. In one example, to estimate a new camera path, a virtual crop window of a pre-defined scale less than one with respect to an original frame size can be designated. A difference transformation between the original and smooth camera path can be applied to the recorded video using the crop window to recast the recorded video as if the video had been recorded from the smooth camera path to remove shake from the recorded video, for example. If the crop window does not fit in the original frame, in one example, undefined areas may be filled using motion-in-painting. In another example, constraints can be imposed to prevent undefined areas from occurring.

Id. at 3:48–63.

We reproduce Figures 8A and 8B of Kwatra below.



Figures 8A–B of Kwatra, reproduced above, left and right, illustrate example graphs of an original camera path motion versus an updated or smooth camera path motion. *Id.* at 3:3–5. Figure 8A shows “motion along the x-axis (or horizontal motion)” and particularly the “original camera path motion 802 . . . as compared to the optimal L1 path.” *Id.* at 19:6–10. As shown, “portions of the optimal L1 path . . . have a constant path[] representing a static camera, . . . a linear path of constant velocity[] representing a panning or a dolly shot, . . . and a parabolic path of constant acceleration[]

representing an ease-in and out transition between static and panning cameras.” *Id.* at 19:9–27.

Figure 8B shows “motion along the y-axis (or vertical motion)” and particularly the “low-frequency bounce originating from a person walking while recording the video.” *Id.* at 19:33–35. The bouncing is “replaced by a static camera model, . . . represented by a straight line . . . as function of time on the graph.” *Id.* at 19:33–38.

3. *Shi (Exhibit 1006)*

Shi relates to “[o]ptical image stabilization (OIS)” and “[e]lectronic image stabilization (EIS).” *Id.* at 1:16–44. “Optical image stabilization (OIS) can decrease shaking and blur present in a video by mechanically moving components of the recording device, such as a lens or the image sensor.” *Id.* at 1:18–21. “Electronic image stabilization (EIS) can also reduce shaking present in video, for example, by aligning and shifting image frames based on analysis of the images.” *Id.* at 1:27–29.

Shi summarizes the system as follows (in part):

An OIS module can stabilize frames during video capture, and position information (e.g., lens shift information) from the OIS module can captured and used in EIS processing. By using OIS lens shift positions, the stabilization processing can correct for distortion caused by the OIS system as well as avoid making adjustments or motion that was already compensated for by the OIS system. . . .

The system can use the device position data and OIS position data during EIS processing to take into account the actual pose of the recording device during capture as well as adjustments to the camera view caused by OIS. As a result, the EIS processing can compensate for motion of the recording device as a whole (e.g., camera shake or other extrinsic movement of the recording

device) as well as image shifts due to operation of the OIS module (e.g., internal lens movements).

Id. at 1:37–55.

In an embodiment, a “frame 211 is . . . captured by an image sensor” and an “EIS module 155 defines a first transformation 162 from data indicating the real positions of the recording device 102 during capture” and “camera elements such as the OIS module elements and lens focus position.” *Id.* at 12:30–35. “The EIS module 155 uses a second transformation 162 . . . [that] corresponds to a virtual lens position, e.g., a hypothetical position that would have resulted in more stable video if used to capture the frame 211,” and “fully defines the data for the output frame 235.” *Id.* at 12:44–51.

A “virtual camera position . . . represent[s] an adjusted or hypothetical pose of the recording device 102 that would stabilize the video being recorded.” *Id.* at 10:63–66. “[T]he virtual camera position can be adjusted through filtering of device positions based on movement detected before and after a frame, based on an amount of blur in the frame, based on a likelihood that panning is occurring, through adjustments to prepare for motion in future frames, and/or to ensure that image data covers an entire output frame.” *Id.* at 11:18–24. Thus, “a range of time around the capture of the frame 211 . . . is analyzed to determine how to transform the frame 211.” *Id.* at 12:15–18. “The time of exposure, T , . . . under analysis can be used as the center of the range.” *Id.* at 12:18–20. “A predetermined time offset, L , can be used to set the range, e.g., a time range from $[T-L, T+L]$,” e.g., “about 7 frames before and about 7 frames after the frame.” *Id.* at 12:20–25.

E. Unpatentability Grounds

1. Unpatentability over Zhou and Kwatra (Ground 1)

Petitioner asserts that claims 1–20 are unpatentable under 35 U.S.C. § 103 as obvious over Zhou and Kwatra. Pet. 8–63. Patent Owner argues the asserted combination of Zhou and Kwatra does not render obvious the following limitations [g][v] and [g][vi] of both independent claims 1 and 11: “wherein the capture trajectory is determined to include a path that minimizes a combination of rotational velocity and rotational acceleration of the housing capture trajectory is determined to include a path that minimizes a combination of rotational velocity and rotational acceleration of the housing, the combination of the rotational velocity and the rotational acceleration of the housing weighing the rotational velocity and the rotational acceleration equally or differently.” Ex. 1001, 18:28–34; Prelim. Resp. 12–15. Patent Owner also argues the Petition fails to identify a motivation to combine Zhou and Kwatra. *Id.* at 15–16. We address Petitioner’s and Patent Owner’s assertions below.

a. Combining Zhou and Kwatra

Petitioner argues that Zhou discloses “[t]echniques to improve a digital image capture device’s ability to stabilize a video stream.” Pet. 8 (quoting Ex. 1004, code (57)). Petitioner argues that Zhou teaches, for example, determining smoothed trajectory based on past/future motion of data and determining a visible frame that fits within an overscan which represents the captured frame. *Id.* at 8–9.

Petitioner argues that Kwatra teaches “methods and systems for processing a video for stabilization.” Pet. 9 (quoting Ex. 1005, code (57)). Petitioner argues that Kwatra attempts to “render the recorded video as the

video would have been recorded from a smooth or stable camera path.” *Id.* at 10 (quoting Ex. 1005, 1:37–40). Petitioner further argues that Kwatra teaches estimating the smooth camera path by minimizing derivatives of the original camera path including minimizing rotational velocity and rotational acceleration. *Id.*

Petitioner argues that it would have been obvious to stabilize against rotation, as taught by Kwatra, because Zhou discloses that video stabilization “dampen[s] the effects of camera shake” in a video and Kwatra similarly discloses using “the smooth camera path to remove shake from recorded video.” *Id.* at 34 (quoting Ex. 1004, 1:41–45; Ex. 1005, 3:58–59). Petitioner argues that Zhou and Kwatra use known techniques in a similar way. *Id.* (citing Ex. 1002 ¶ 114).

Petitioner further argues that a person having ordinary skill in the art would understand that camera shake includes rotational motion. *Id.* (citing Ex. 1004 ¶ 115). Petitioner argues that Kwatra’s smooth camera path would further reduce the camera shake that Zhou seeks to dampen. *Id.* Petitioner argues that the Zhou-Kwatra combination is thus a combination of prior art elements according to known methods to yield predictable results. *Id.* (citing Ex. 1002 ¶ 117).

Based on the evidence presented, Petitioner adequately establishes that a person having ordinary skill in the art would have had reason to combine the teachings of Zhou and Kwatra with a reasonable expectation of success. Pet. 8–10, 30–35; Ex. 1002 ¶¶ 104–117; Ex. 1004, 1:41–45, 7:41–42, 7:47–54, 9:64–65, 11:55–67, Fig. 7; Ex. 1005, code (57), 1:17–19, 1:52–57, 5:64–6:5, 13:23–48, 13:66–14:37, 16:13–32, 17:38–48, 18:54–56, 26:12–21, Fig. 13.

Patent Owner argues that “Petitioner fails to identify a motivation to combine Zhou and Kwatra to arrive at the claimed invention of the ’894 [p]atent.” Prelim. Resp. 15. On the present record, we disagree. As explained above, Petitioner adequately explains that a person having ordinary skill in the art would have had reason to apply Kwatra’s stabilization techniques to Zhou in order to improve Zhou in the same way the techniques improve Kwatra. Also, as we explain when discussing claim 1, below, Petitioner adequately establishes that the combined teachings of Zhou and Kwatra would have led a person having ordinary skill in the art to arrive at the claimed invention.

Patent Owner also argues Petitioner fails to “provide an adequate analysis regarding a reasonable expectation of success or the motivation to combine Zhou and Kwatra.” Prelim. Resp. 16. Patent Owner argues that the analysis of Petitioner’s declarant is “superficial and conclusory and ignores the deeper differences in the approaches of Zhou and Kwatra.” *Id.* at 17–18. Patent Owner argues that Zhou focuses on “a strength parameter based on estimated motion blur” while Kwatra discusses minimizing derivatives in a “limited case.” *Id.* at 18. On this record, Patent Owner’s argument does not persuasively undermine Petitioner’s showing of rationale to combine with reasonable expectation of success. Petitioner’s statements regarding reason to combine must be considered in view of the context provided by the entire Petition including Petitioner’s discussion of the teachings of Zhou and Kwatra individually. *See, e.g.*, Pet. 8–63. Similarly, the opinions of Dr. Katsaggelos regarding reason to combine (*see, e.g.*, Ex. 1002 ¶¶ 102–129) must be considered given the complete context of Dr. Katsaggelos’s discussion of the cited art and technology. *Id.* ¶¶ 44–136.

Petitioner, and Dr. Katsaggelos, explain the references' teachings and, based on these teachings, conclude that a person having skill in the art would have had reason to combine with reasonable expectation of success based on those teachings. Reason to combine may properly come from the references themselves. *KSR Int'l Co.*, 550 U.S. at 418 (explaining reason to combine may come from "interrelated teachings of multiple patents"). Also, Dr. Katsaggelos testifies, for example, that the similarities of Zhou and Kwatra and their similar "mobile device components for stabilization" would permit "Kwatra's techniques [to be] readily incorporated into Zhou's device." Ex. 1002 ¶ 117 (citing Ex. 1004, 7:47–54, 11:55–67, Fig. 7; Ex. 1005, code (54), 26:12–21, Fig. 13). On this record and based on the teachings of these references and the great similarity of the references' technology, as we discuss above and, in more detail, below, Petitioner adequately shows that a person having skill in the art would have had reason to combine the teachings of the references with a reasonable expectation of success.

Patent Owner also focuses on Petitioner's "attempt to combine Zhou and Kwatra to address the limitation requiring minimization of both rotational velocity and rotational acceleration." Prelim. Resp. 17. As we explain below when addressing claim 1, Petitioner adequately explains how Kwatra teaches this recitation.

b. *Claim 1*

[Preamble] A system that stabilizes videos, the system comprising:

Petitioner argues that, to the extent the preamble is limiting, Zhou teaches a system that stabilizes low light video. Pet. 10. Based on the current record, we find that Petitioner's argument is sufficiently supported by

evidence. *See, e.g.*, Ex. 1004, 2:59–61.

[a] a housing of an image capture device;

Petitioner argues that Zhou discloses that its digital image capture device can be a mobile phone or portable camera and that a person having ordinary skill in the art would have understood that a housing encloses the components of Zhou Figure 7. Pet. 10–11. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.*, Ex. 1004, code (57), Fig. 7, 11:55–56, 11:60–67; Ex. 1002 ¶ 56.

[b][i] an optical element carried by the housing and configured to guide light within an optical field of view to an image sensor,

Petitioner argues that Zhou discloses a lens configured to guide light to an image sensor and that this is an optical element. Pet. 11–13. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.*, Ex. 1004, 7:52–53, 11:62–65, 12:31–37, 14:4–9; Ex. 1002 ¶¶ 57–60.

[b][ii] the optical field of view being greater than a capture field of view for generating video content;

Petitioner argues that Zhou’s captured frame 305 corresponds to the “optical field of view.” Pet. 13–15. Petitioner argues that the field of view of captured frame 305 is larger than the size of visible frame 300. *Id.* Petitioner cites, for example, Zhou Figure 3 to explain this point. *Id.* at 14. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.*, Ex. 1004, 3:1–3, 4:20–29, 7:25–26, 12:16–18; Ex. 1002 ¶¶ 61–65.

[c][i] the image sensor carried by the housing and configured to generate an image output signal based on light that becomes incident thereon during a capture duration,

Petitioner argues that a person having ordinary skill in the art would have understood that Zhou’s image sensor is configured to generate an image output signal based on light that strikes the image sensor. Pet. 15. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.*, Ex. 1004, 2:12–13; Ex. 1002 ¶¶ 66–67.

[c][ii] the image output signal conveying image information that defines images with the optical field of view;

Petitioner argues that Zhou discloses that the video stream constituting image information is placed in a buffer and corresponds to captured frames. Pet. 15–16. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.*, Ex. 1004, 4:20–34, 7:24–25, 8:62–63; Ex. 1002 ¶ 68.

[d][i] a position sensor carried by the housing and configured to generate a position output signal based on positions of the housing during the capture duration,

Petitioner argues that Zhou discloses motion sensors that correspond to position sensors and argues that the time duration of the captured video stream corresponds to capture duration. Pet. 16–17. Petitioner argues that Zhou discloses that each image within the captured motion stream has corresponding motion information which can be time stamped. *Id.* Petitioner argues that “[b]ecause the image capture device includes the *housing*, the motion information . . . of the device reflects the position information of the

housing.” *Id.* at 17.⁶ Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.*, Ex. 1004, 2:13–16, 4:23–29, 5:20–24, 11:62–63; Ex. 1002 ¶¶ 71–72.

[d][ii] the position output signal conveying position information that characterizes the positions of the housing at different moments within the capture duration, the positions of the housing including rotational positions of the housing; and

Petitioner argues that a person having ordinary skill in the art would have understood that position information is conveyed by position output signals generated by Zhou’s motion sensors. Pet. 18. Zhou discloses, for example, “time stamped gyroscope data points” that reflect “orientation . . . during the capture.” Ex. 1004, 5:20–24. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.*, Ex. 1004, 2:12–16, 4:36–38, 5:20–24; Ex. 1002 ¶¶ 74–76.

[e] one or more physical processors configured by machine readable instructions to:

Petitioner argues that Zhou discloses processor 705 which may execute instructions to carry out control device 700’s functions. Pet. 19. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.*, Ex. 1004, Fig. 7, 11:60–61, 12:1–3.

⁶ Petitioner colors the word “housing” green. Pet. 17. This decision omits color when providing quotations.

[f][i] determine an observed trajectory of the housing during the capture duration based on the position information, the observed trajectory reflecting the positions of the housing at the different moments within the capture duration,

Petitioner argues that Zhou teaches storing each frame of the video stream's motion data into a motion data entry as illustrated by Zhou Figure 2B. Pet. 19–20. Petitioner argues that Zhou thus teaches this recitation. *Id.* Petitioner also argues that Zhou teaches an uncorrected (observed) trajectory 600. *Id.* at 21–22. Based on the current record, we find that Petitioner's argument is sufficiently supported by evidence. *See, e.g.*, Ex. 1004, 4:33–34, 9:63–65, 10:19–21, Figs. 2B, 6; Ex. 1002 ¶¶ 78–80.

[f][ii] the observed trajectory including a first portion corresponding to a first moment within the capture duration and a second portion corresponding to a second moment subsequent to the first moment within the capture duration;

Petitioner argues that Zhou teaches a “‘current frame’ as the ‘frame in frame buffer entry 230’ with corresponding ‘motion data in motion buffer entry 245.’” Pet. 22 (quoting Ex. 1004, 5:9–11). Petitioner also argues that buffer system 200 has “entries having positive prefixes” corresponding to “frames captured after frame and motion entry 230 and 245.” *Id.* (quoting Ex. 1004, 4:40, 4:51–52). Petitioner argues that motion entry 245 corresponds to a first moment in the captured video and later entries such as the +2 entry in Zhou Figure 2B corresponds to a second moment. *Id.* at 23. Based on the current record, we find that Petitioner's argument is sufficiently supported by evidence. *See, e.g.*, Ex. 1004, 4:40, 4:51–52, 5:9–11, Fig. 2B; Ex. 1002 ¶¶ 81–85.

[g][i] determine a capture trajectory of the housing based on a look ahead of the observed trajectory,

Petitioner argues that Zhou teaches use of a look-ahead buffer that can look into the future to determine smoothed motion based on past/future motion data. Pet. 24–25. Petitioner argues that the determined capture trajectory based on future motion data corresponds to a later portion of the observed trajectory after the current frame. *Id.* Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.,* Ex. 1004, 2:61–64, 7:47–51, 10:1–2, Fig. 2B; Ex. 1002 ¶¶ 86–91.

[g][ii] the capture trajectory reflecting actual and/or virtual positions of the housing from which orientations of the capture field of view with respect to the optical field of view of the images are determined,

Petitioner argues that Zhou teaches “moving *visible frame 300* with respect to *captured frame 305*” and “discloses that its smoothed trajectory is a ‘smoothed/stabilized trajectory of the image capture device,’ which includes a housing.” Pet. 25–27. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.,* Ex. 1004, 2:12–13, 6:51–53, 7:32–34, 12:66–13:17, Fig. 3; Ex. 1002 ¶¶ 93–96.

[g][iii] the look ahead of the observed trajectory including use of a subsequent portion of the observed trajectory to determine a preceding portion of the capture trajectory such that a portion of the capture trajectory corresponding to the first portion of the observed trajectory, which corresponds to the first moment within the capture duration, is determined based on the second portion of the observed trajectory, which corresponds to the second moment within the capture duration,

Petitioner argues that Zhou discloses a smooth trajectory generated after video stabilization that corresponds to an observed trajectory. Pet. 27–28. Petitioner argues that Zhou teaches using a look-ahead buffer to anticipate future frames. *Id.* at 28–29. Petitioner argues that Zhou thus discloses determining a trajectory corresponding to the current frame based on subsequent trajectory that corresponds to subsequent, future frames. *Id.* at 29–30. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.,* Ex. 1004, 2:61–54, 7:47–51, Fig. 2B; Ex. 1002 ¶¶ 97–101.

[g][iv] the capture trajectory having smoother changes than the observed trajectory,

Petitioner argues that Zhou teaches a video stabilization operation and that a person having ordinary skill in the art would have understood that the smooth trajectory (the captured trajectory) is generated after video stabilization. Pet. 30. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.,* Ex. 1004, 7:47–51, 8:50–52; Ex. 1002 ¶¶ 102–103.

[g][v] wherein the capture trajectory is determined to include a path that minimizes a combination of rotational velocity and rotational acceleration of the housing,

Petitioner argues that Zhou discloses that video stabilization determines a correction difference and that the stabilization strength parameter determines an amount of smoothing for rotation. Pet. 31. Petitioner argues that, because Zhou “does not specify the rotational motion characteristics to adjust,” a person having ordinary skill in the art would turn to a reference that discloses specific rotational motion characteristics to adjust to stabilize a video. *Id.*

Petitioner argues that Kwatra teaches determining a modified motion camera path “including for each time t the substantially constant path, the substantially constant velocity, or the substantially constant acceleration of the original motion path of the camera.” Pet. 31–32 (quoting Ex. 1005, 1:52–57). Petitioner argues that Kwatra discloses stabilization to compensate for angular movement and to account for rotation. *Id.* at 32. Petitioner argues that Kwatra teaches minimizing first and second derivatives of P where P is a function of the camera path. *Id.* at 32–33. Petitioner argues that a person having ordinary skill in the art would have understood that the first derivative represents velocity of the camera path and the second derivative represents acceleration. *Id.* Petitioner argues that because the camera path includes rotational movement, the derivatives of the camera path account for rotational velocity and acceleration. *Id.* at 33. Petitioner argues that Kwatra also teaches assigning weights a , b , and c to the path, velocity, and acceleration functions. *Id.* at 33–34. Petitioner further argues that it would have been obvious to stabilize against rotation by minimizing rotational

velocity and acceleration. *Id.* Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.*, Ex. 1004, 7:41–42, 7:47–54, 9:64–65, 11:55–67; Ex. 1005, 1:17–19, 1:52–57, 3:58–59, 5:64–65, 13:23–48, 13:66–14:37, 16:13–32, 17:38–48, 18:54–56, 26:12–21, Fig. 13; Ex. 1002 ¶¶ 104–117.

Patent Owner argues that Kwatra “does not provide a method for balancing and weighing *rotational* velocity and *rotational* acceleration, particularly across the yaw, pitch, and roll angles of the camera, as required by the ’894 [p]atent.” Prelim. Resp. 13 (citing Ex. 2001 ¶ 51). As a threshold matter, we note that claim 1 of the ’894 patent does not refer to “yaw, pitch, and roll angles,” and Patent Owner provides no argument as to why claim 1 should be construed to require “balancing and weighing” across “yaw, pitch, and roll angles.”

Patent Owner’s argument (Prelim. Resp. 13–15) hinges on reading Kwatra so that Kwatra’s discussion of minimizing velocity and acceleration (*see, e.g.*, Ex. 1005, 13:23–16:50) does not teach or suggest minimizing *rotational* velocity or acceleration. Patent Owner’s argument presents a disputed fact issue to finally resolve at trial, but, nonetheless, Petitioner on the current record demonstrates a reasonable likelihood of establishing that Kwatra’s discussion of minimizing velocity and acceleration teaches or suggests minimizing rotational velocity and acceleration.

We note that Kwatra suggests use of a model that accounts for rotation as a degree of freedom (DOF). Ex. 1005, 11:5–11. Kwatra further states that its motion model might identify “too much rotation.” *Id.* at 11:63–66. This discussion precedes Kwatra’s discussion of minimizing position, velocity, and acceleration cost functions (*id.* at 13:23–16:50) such that a

person of ordinary skill in the art would have understood that these cost functions also refer to rotational movement. This reading of Kwatra is further supported by Kwatra referring to constraints in its function limiting “range of change in zoom and rotation.” *Id.* at 16:31–35.

While Patent Owner’s argument does not undermine Petitioner’s showing for institution purposes, we will reach a final determination of how a person of ordinary skill in the art would have understood these passages of Kwatra for trial after a full development of the record if Patent Owner maintains this argument in the Patent Owner response.

[g][vi] the combination of the rotational velocity and the rotational acceleration of the housing weighing the rotational velocity and the rotational acceleration equally or differently;

Petitioner argues that Kwatra teaches determining a stable camera path by use of a cost function where a, b, and c provide weights to the path, velocity, and acceleration functions. Pet. 35. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.,* Ex. 1005, 13:66–14:37; Ex. 1002 ¶ 119.

Above, we address Patent Owner’s arguments with respect to this recitation when addressing recitation [1][g][v].

[h] determine the orientations of the capture field of view for the images with respect to the optical field of view of the images based on the capture trajectory of the housing; and

Petitioner argues that Zhou teaches calculating movement for the visible frame 300 within captured frame 305 with the difference being overscan 310. Pet. 36–37. Petitioner argues that Zhou teaches that movement of the visible frame 300 within the captured frame is based upon the video

stabilization operation 100. *Id.* Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.,* Ex. 1004, 7:24–26, 7:47–51; Ex. 1002 ¶¶ 120–129.

[i][i] generate the video content based on a punch-out of visual content of the images within the capture field of view,

Petitioner argues that Zhou teaches that only video frame 300 is visible to the user such that visible frame 300 is the recited “punch-out.” Pet. 37–38. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.,* Ex. 1004, 12:13–14; Ex. 1002 ¶¶ 130–131.

[i][ii] wherein use of the visual content of the images within the capture field of view to generate the video content provides stabilization that creates a more stable view than use of entire visual content of the images.

Petitioner argues that the visible frame 300 is visual content within the capture field of view and Zhou’s stabilized video is more stable than captured frames 305 of the captured video. Pet. 38–39. Based on the current record, we find that Petitioner’s argument is sufficiently supported by evidence. *See, e.g.,* Ex. 1004, 12:13–19, Fig. 3; Ex. 1002 ¶¶ 134–136.

Conclusion as to claim 1

Based on the evidence in the present record, we find that Petitioner has shown sufficiently for purposes of this Decision that the combination of Zhou and Kwatra teaches or suggests all elements of claim 1 and that Petitioner sufficiently shows that a person of ordinary skill in the art would have had reason to combine the references’ teachings with rational underpinning and reasonable expectation of success. Thus, based on the

above and based on consideration of objective indicia as discussed below, we determine Petitioner has established a reasonable likelihood of prevailing in showing that claim 1 is unpatentable over the combination of Zhou and Kwatra.

c. Remaining Claims 2–20

Each of claims 2–10 and 12–20 depends from one of independent claims 1 and 11. Ex. 1001, 17:47–20:64. Petitioner accounts for claim 11 by asserting that claim 11 recites limitations that are each “similar to” or “mirror” the limitations of claim 1. Pet. 61–62. Petitioner accounts for the limitations of: dependent claims 2–10 and 12–20 by directly addressing the limitations of claims 2–10 (*id.* at 39–61); and claims 12–20 (depending from claim 11) by asserting claims 12–20 respectively “mirror” the limitations of claims 2–10 (*id.* at 62–63). Patent Owner does not separately argue claims 2–10 and 12–20 at this time.

Petitioner shows sufficiently for purposes of this Decision that each element of claims 2–20 is taught or suggested by the combined teachings of Zhou and Kwatra, a reason to combine the references’ teachings with rational underpinning, and reasonable expectation of success. Thus, we determine that Petitioner has established a reasonable likelihood of establishing claims 2–20 would have been obvious in view of Zhou and Kwatra.

*2. Unpatentability over Zhou and Kwatra, and Shi
(Ground 2)*

Petitioner asserts that claims 2, 3, 7, 12, 13, and 17 are unpatentable under 35 U.S.C. § 103 as obvious over Zhou and Kwatra, and Shi. Pet. 63–

71. Patent Owner argues “Shi does not (and is not even alleged to) cure the deficiencies of Zhou and Kwatra.” Prelim. Resp. 16.

Each of claims 2, 3, 7, 12, 13, and 17 depends from one of independent claims 1 and 11. Ex. 1001, 28:6–30:60. Petitioner accounts for the limitations of: dependent claims 2, 3, 7, 12, 13, and 17 by directly addressing the limitations of claims 2, 3, and 7 (*id.* at 64–70); and claims 12, 13, and 17 (depending from claim 11) by asserting claims 12, 13, and 17 respectively “mirror” the limitations of claims 2, 3, and 7 (*id.* at 70–71). Patent Owner does not separately argue claims 2, 3, 7, 12, 13, and 17 at this time.

Petitioner shows sufficiently for purposes of this Decision that each element of claims 2, 3, 7, 12, 13, and 17 is taught or suggested by the combined teachings of Zhou and Kwatra, and Shi, a reason to combine the references’ teachings with rational underpinning, and reasonable expectation of success. Thus, we determine that Petitioner has established a reasonable likelihood of establishing claims 2, 3, 7, 12, 13, and 17 would have been obvious in view of Zhou and Kwatra, and Shi.

IV. OBJECTIVE INDICIA

Patent Owner asserts that objective indicia establish nonobviousness. Prelim. Resp. 19–27. Patent Owner’s position is underpinned by its evidence alleging to show its “dominant position in the U.S. action camera market,” based on its “HyperSmooth technology” that it asserts “has garnered widespread industry recognition.” *See generally id.* However, even assuming Patent Owner has a revolutionary and successful product, that does not mean that all claims of its patents would have been nonobvious. For us to give substantial weight to objective indicia of nonobviousness, a proponent must

establish a nexus between the evidence and the merits of the *claimed* invention. *ClassCo, Inc., v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016). “[T]here is no nexus unless the evidence presented is ‘reasonably commensurate with the scope of the claims.’” *Id.* (quoting *Rambus Inc. v. Rea*, 731 F.3d 1248, 1257 (Fed. Cir. 2013)); *see also Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010) (“For objective evidence of secondary considerations to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention.”) (brackets and emphasis omitted) (quoting *In re GPAC, Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995)).

Patent Owner here has not attempted a nexus analysis in its Preliminary Response. At best, it improperly incorporates by reference a claim chart (Exhibit 2016). Prelim. Resp. 20; 37 C.F.R. § 42.6(a)(3) (“Arguments must not be incorporated by reference from one document into another document.”). On this record, we cannot determine whether, or the extent to which, Patent Owner’s assertions of nonobviousness are due to the claimed invention because of the failure to show nexus to the subject matter of the claims.

V. CONCLUSION

For the reasons above, we determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim of the ’894 patent. At this juncture in the proceeding, we have not made a final determination with respect to the patentability of the challenged claims, or with respect to claim construction.

VI. ORDER

For the foregoing reasons, it is

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–20 of the '894 patent is hereby instituted with respect to all grounds of unpatentability set forth in the Petition; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; the trial will commence on the entry date of this Decision.

IPR2024-01186
Patent 10,574,894 B2

For PETITIONER:

Mehran Arjomand
Alex Yap
Jean Nguyen
MORRISON & FOERSTER LLP
marjomand@mofo.com
ayap@mofo.com
jnguyen@mofo.com

For PATENT OWNER:

James Glass
John McKee
Quincy Lu
QUINN EMANUEL URQUHART & SULLIVAN LLP
jimglass@quinnemanuel.com
johnmckee@quinnemanuel.com
quincylu@quinnemanuel.com