

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.

Patent No. 11,336,832

Inter Partes Review No. IPR2024-01052

PETITIONER'S REPLY TO PATENT OWNER RESPONSE

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Excerpts of Deposition Transcript of Daryl Stimm (GoPro) dated September 13, 2024 (RX-0323C) in Concurrent ITC Investigation	1026 [NEW]
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I. INTRODUCTION

GoPro’s Patent Owner Response confirms that all challenged claims of U.S. Patent No. 11,336,832 (“the ’832 patent”) should be canceled. GoPro’s arguments rely on narrow claim constructions that contradict the claim language, exclude embodiments in the specification, conflict with its positions in the concurrent ITC litigation, and/or have been rejected by the Board. As the Board has found, GoPro’s “slim” record fails to show any objective indicia of non-obviousness. (Paper 10 (“DI”), 54). Finally, the ALJ in the concurrent ITC investigation has found that Thomason and Watanabe disclose claims 1, 3, 4, 7, 8 by clear and convincing evidence. (EX1027, 159-166.)¹

II. CLAIM CONSTRUCTION

A. “Including” (claims 1, 11) is not “Equating”

Regarding the claimed “the horizon-leveled visual content including a punchout of the extents of the visual content defined by the viewing window” GoPro asks the Board to replace “including” with “*equating*.” (Paper 24 (“POR”), 57-59.) “Include” does not mean “equate.” (EX1019, ¶¶9-10.) The claims never recited “equate.” Instead, they consistently require that the horizon-leveled visual content *include* the visual content defined by the viewing window. (EX1001,

¹ Unless otherwise noted, emphases in bold are added.

claims 1 and 11.) GoPro points to no evidence supporting “equating.” (EX1019, ¶11.)

B. GoPro’s interpretation of “the visual content” (all claims) is untenable

GoPro asks the Board to rewrite “the visual content” in claim 1 as “*original* visual content” that has not been horizon-leveled. (POR, 17.) GoPro pushes for an even narrower construction for claim 3—that a distortion must exist in the original visual content and “remain” the same after horizon-leveling. (*Id.*, 17-18.) In asserting infringement before the ITC, GoPro never argued, much less applied such narrow interpretations. (*See* EX1017, 269:14-20.)

The Board should give “the visual content” its ordinary and customary meaning—that is, the graphical information. (EX1019, ¶¶12-13.) Dr. Foroosh testified that the term means “viewable aspects that you see.” (EX1018 (Foroosh Depo. Tr.), 100:12-20.) By itself, the term does not specify *when* the information is obtained or *where* it is stored; it must be understood in the context of the entire claim language. (*Id.*, ¶13.)

The claims make clear that “the visual content” can be part of “the video content” or part of “the horizon-leveled visual content.” Claim 1 recites “the *horizon-leveled visual content including* a punchout of the extents of *the visual content* defined by the viewing window, wherein *inclusion of* the extents of *the visual content* defined by the viewing window *within the horizon-leveled visual*

content effectuates horizon leveling of the visual content.” The same pixels in an original video still exist in the horizon-leveled video (albeit at different locations potentially). (EX1019, ¶¶14-17.) Dr. Foroosh concedes that this limitation “connects the visual content [] to both viewing window and horizon-leveled visual content.” (EX1018, 106:8-9, 106:18-22.)

It thus follows that the limitation “the visual content includes a distortion” in claim 3 is disclosed if the “horizon-leveled visual content” includes a distortion. (EX1019, ¶18.) Likewise, the limitation “the visual content includes the distortion based on application of the distortion to non-distorted visual content” in claim 6 is disclosed if “horizon-leveled visual content” includes application of the distortion to non-distorted visual content. (*Id.*)

As Dr. Katsaggelos explains, it makes sense to first perform horizon-leveling and ***then add distortion to fix any imperfect horizon leveling***. (EX1019, 20.) This is consistent with the ’832 specification. It discloses that “[t]he ***horizon-leveled visual content*** may include an off-axis horizon based on imperfect horizon leveling of the visual content.” (EX1001, 21:54-57; *see also id.*, 21:52-54; 22:49-23:3.) The specification teaches “***remov[ing] the existing distortion and then appl[y]ing the desired distortion***.” (EX1001, 23:1-3; EX1019, ¶¶19-20.)

C. “simulate changes in zoom” (claims 8, 18) requires no “smoothed” zoom

GoPro asks the Board to narrow the claimed “simulate changes in zoom” to implement a “smoothed zoom curve.” (POR, 34.) The Board has rejected GoPro’s attempt to limit claim 1 in the same way. (DI, 19-21). GoPro’s attempt to rehash the same argument for claims 8 and 18 should be rejected.

GoPro’s narrow interpretation of “simulate” contradicts the claim language. The claim recites “simulate changes in zoom.” It does not restrict the changes in zoom to be “smoothed” or otherwise. (EX1019, ¶¶21-22.)

The ’832 specification confirms that “simulate” does not require a “smoothed zoom.” (*Id.*, 23.) It describes “simulating a constant zoom” and “simulating . . . a zoom with pronounced (e.g., rapid. Jittery) changes.” (EX1001, 19:12-15.) It also provides examples of zoom “simulations” in FIGs. 6A and 6B, which are *not* a “smoothed zoom curve.” (*Id.*, 18:11-12; 18:45-46). Dr. Foroosh’s testimony confirms this. (EX1018, 52:6-13.)

The Board should give “simulate” its ordinary and customary meaning. The Cambridge Dictionary defines “simulate” as “to do or make something that looks real but is not real.” (EX1020, 1). This is consistent with the ’832 specification, which uses “simulate” to explain that zoom is not achieved by receiving a user input (e.g., a “zoom button/switch/dial”), but instead achieved by rotation of the camera. (EX1001, 12:55-59; EX1019, ¶24).

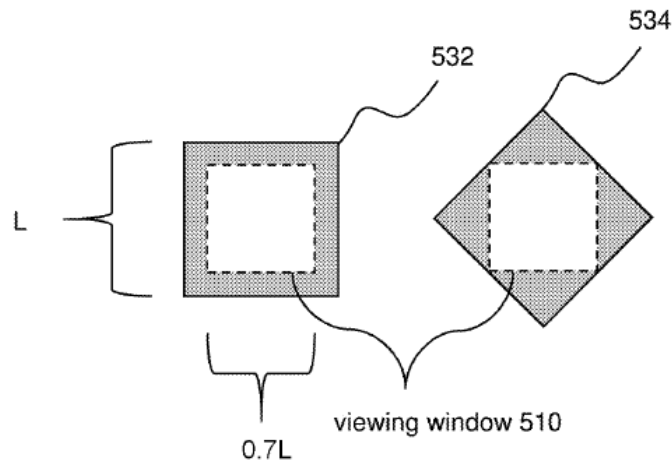
D. “determination of a location of the viewing window” (claims 10, 20) does not require location to be a “coordinate” or to change

GoPro asks the Board to rewrite the claimed “determination of a location of the viewing window” to determination of an “x-y coordinate” that must “change” across frames. (POR, 35-36.)

Construing “location” as a point contradicts with the claim language, which recites that “the location of the viewing window . . . determining *framing* of the visual content.” A point, by itself, cannot determine “framing” of visual content. (EX1019, ¶¶25-26). Only an area can determine framing. (*Id.*).

Nor do the claims require that the location “change” as GoPro asserts. The claims require that the location of the viewing window be *determined*. Contrary to GoPro argument, the Board’s construction—that the “function of progress” language in claim 1 requires “determining a viewing window *for different times of the video*”—does not require the location to change. (EX1019, ¶¶27-28).

During the deposition, Dr. Foroosh contradicts his own position by stating “I don’t think the board expressed an opinion on that change either way” and “Claim 10, in a sense, is broader. *It meets both cases. [[W]hether there are changes or not, it meets it.*” (EX1018, 68:4-11, 78:15-79:1.) He also admits that FIG. 5 of the ’832 patent discloses that the viewing window’s center point remains the same for different frames. (*Id.*, 58:4-25; EX1019, ¶31.)

**FIG. 5C**

Regardless, a comparison between claims 7 and 10 shows that “as the function of progress” is deliberately omitted from claim 10. Thus, the “function of progress” language is not tied to the determination of the location specifically. Even under GoPro’s mischaracterization of the Board’s construction, the claims would only require that the viewing window change as a whole. There is no requirement that *all attributes* of the viewing window change. (EX1019, ¶¶32-33.) And as Dr. Foroosh concedes, claim 10 omits the term “change” recited in claim 8. (EX1018, 98:17-6.) This further undercuts GoPro’s narrow construction.

GoPro also attempts to improperly limit these claims to two embodiments in the patent related to “simulating panning” and “content detection,” solely due to the term “framing.” (POR, 36-37.) Dr. Foroosh alleges that “framing refers to drawing the viewer’s attention to certain elements within the image.” (EX2021, ¶99). Even leaping from this narrow definition of “framing” to requiring content

detection/focusing or panning is far-fetched. (EX1019, ¶¶34.) The '832 patent never limit the location determination to these embodiments. (*Id.*)

III. GROUND 1: THOMASON AND PACURARIU (CLAIMS 1, 2, 7-12, 17-20)

A. The Thomason-Pacurariu system teaches horizon-leveling multiple frames in a video (all claims).

GoPro's lone argument for saving independent claims 1 and 11, other than a motivation-to-combine argument, is that Thomason does not teach collecting rotational position information for "different frames of a video" or determining a viewing window for "multiple video frames." (POR, 41.)

GoPro's argument is moot. Pacurariu explicitly teaches—and GoPro does not dispute—that rotational position information is obtained "for each video frame" and horizon-leveling is performed frame-by-frame. (EX1005, FIGs. 6 and 7.) The Petition articulates the Thomason-Pacurariu combination "generate[s] a rotated image for *each video frame*." (Petition, 23; EX1019, ¶¶35-36.)

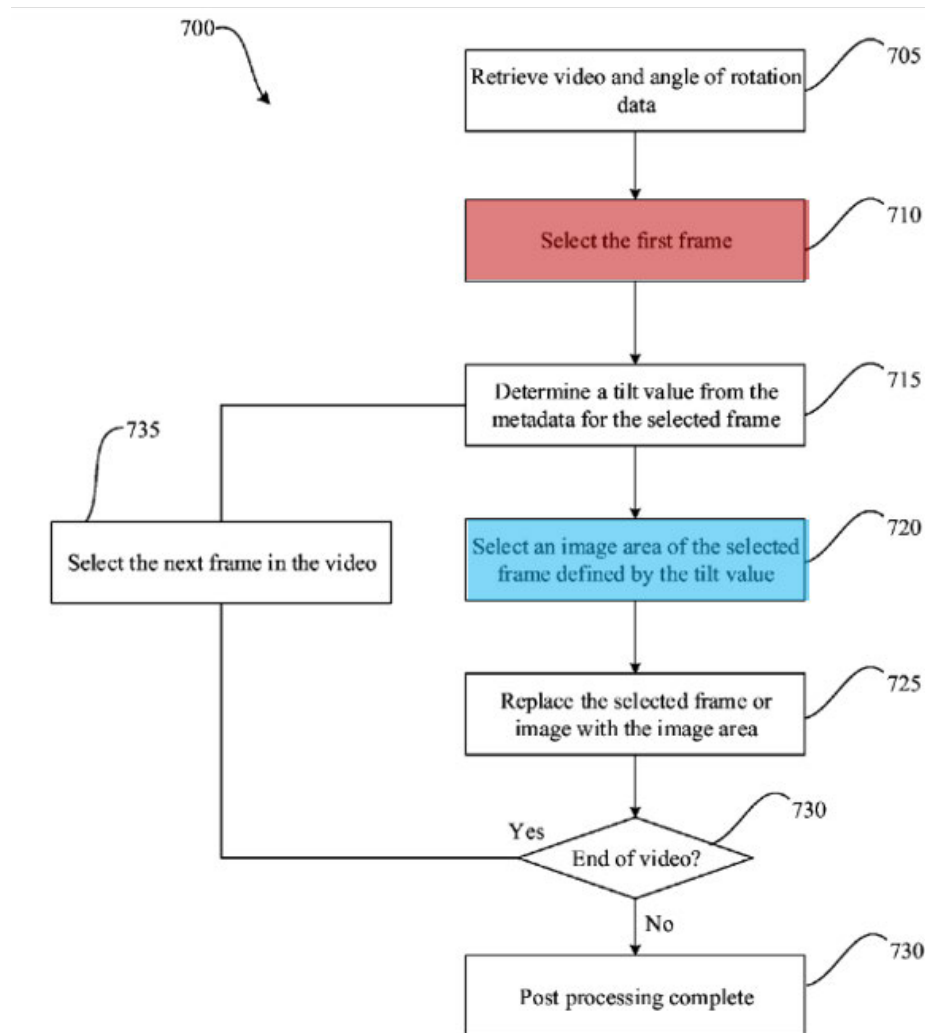


Figure 7

Regardless, Thomason teaches frame-by-frame horizon-leveling. A POSITA would understand that Thomason discloses horizon-leveling multiple frames in a video (i.e., “sequence of items of image 8”). (EX1019, ¶¶37-38; EX1018, 115:17-116:1 (agreeing Thomason discloses “processing videos”).)

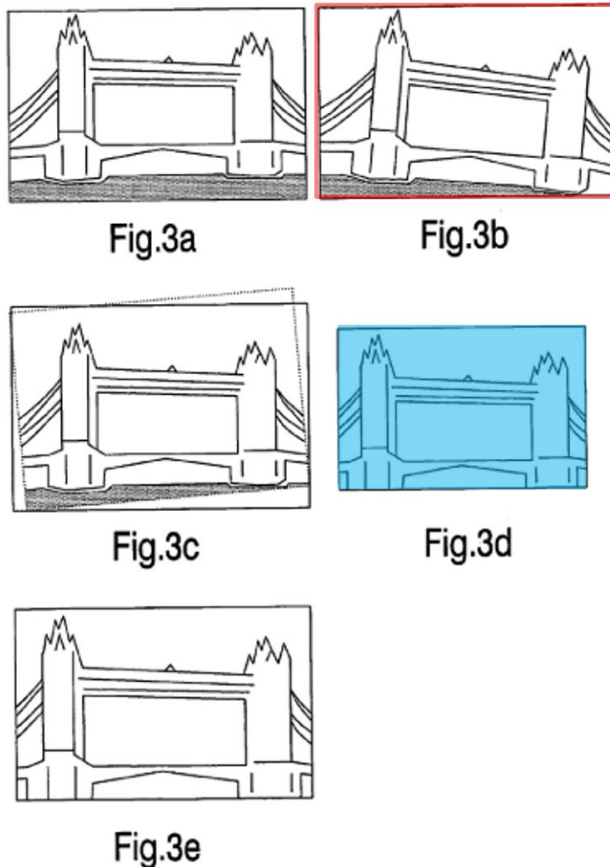
GoPro misrepresents that Thomason performs a “one-time tilt adjustment.” (POR, 45.) Thomason is clear that a video is “*a sequence of items of image data 8*

representing sequential frames of the moving image.” (EX1004, [0027]).

Thomason teaches performing horizon-leveling on a frame-specific basis. Dr.

Foroosh agreed that “Figure 3 is describing horizon-leveling of an image based on the rotational amount for *that particular image*,” not some other images.

(EX1018, 143:11-14; EX1004, [0004] and claim 10.)



To justify its mischaracterization, GoPro *incorrectly altered* quotation of Thomason: “process[ing] the recorded image data 8 [i.e. the captured video] and rotation angle.” (POR, 29.) Everything in the bracket is added by GoPro. The original citation only refers to “image data” and makes no mention of “video.”

Here, Thomason teaches that recorded image data 8 is processed using its corresponding rotation angle. It follows that video frames are horizon-leveled using their respective frame-specific rotation information. (EX1019, ¶39.)

Notably, Dr. Foroosh admits that “image data 8” refers to an image, not a video, stating “image data could mean just the image itself, raw data or it could mean also including maybe additional metadata.” (EX1018, 136:3-18; EX1019, ¶40.)

None of GoPro’s other arguments has merit. (*Id.*, ¶¶41-46.) GoPro’s allegation that “Thomason’s camera is not intended to be hand-held operated” is wrong as Thomason discloses a camera “incorporated into . . . a *mobile telephone*.” (EX1004, [0016].) GoPro mischaracterizes Thomason as suitable for “still” cameras, ignoring Thomason’s title is “[i]mage rotation correction for *video* or photographic equipment” and related disclosure of “video” processing. (*Id.*, [0001].)

GoPro’s argument that Thomason involves a “fixed, yet slightly misaligned video camera” because Thomason’s cameras are “frequently used by amateurs” defies logic. (POR, 29.) Nowhere does Thomason limit its camera use by amateurs. If anything, an “amateur” who has “difficulties in correctly orienting the camera” would likely *greatly* misalign a camera. (EX1019, ¶44.)

GoPro’s assertion that Thomason’s system lacks adequate hardware for horizon-leveling is nonsensical. (*Id.*) GoPro misrepresents that Thomason only

uses “a *single* accelerometer” and thus “can only infer rotation in *one* dimension.” (POR, 31.) Thomason expressly teaches that “[a] *plurality of sensors* may be provided to allow for image correction *in a number of planes*, for example corrections for rotation and tilt.” (EX1004, [0015].) “The rotation sensor **14** may be a *multiple angle rotation sensor*, capable of *measuring orientation about more than 1 axis* and storing the result in memory **12**.” (EX1004, [0041]; *see also id.*, [0004], [0007], [0017], [0041].) Nor does Thomason limit the “sensors” to accelerometer. And GoPro’s argument that Thomason’s sensor is not “accurate” flies in the face of Thomason, which discloses “correcting the image data so that the image is *accurately* horizontal.” (EX1004, [0042].) The Petition and Dr. Katsaggelos’ original declaration repeatedly rely on “rotation sensor 14.” (Petition, 19; EX1002, ¶¶59, 75, 91.)

Dr. Foroosh’s argument that Thomason’s multiple sensors are used for a different purpose—e.g., for generating panoramic images—is unavailing. That these sensors “may then be used” (EX1004, [0041]) for another purpose does not preclude their use for measuring orientations for multiple axes. (EX1019, ¶45.)

B. The Thomason-Pacurariu system teaches determining a “size” of the viewing window (claims 7, 17).

GoPro’s contends that Thomason does not disclose changing the size of the viewing window because it is limited to an “one-time” correction. (POR, 45.) Not so. (*Supra* § III.A.) In FIG. 3, the size of the viewing window FIG. 3d is based on

how much of FIG. 3c needs to be cropped, which depends on the amount of rotation in FIG. 3b. (EX1019, ¶47.) A POSITA reading Thomason would understand that “based on the degree of rotation, more or less of the image would need to be cropped.” (EX1002, ¶119; *see also* EX1027 (“ITC ID”), 162.)

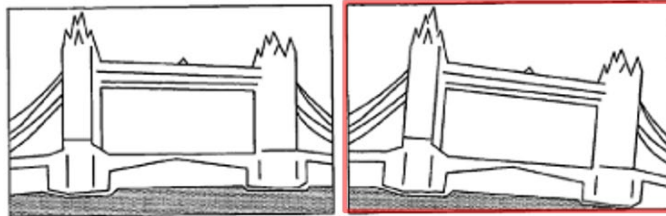


Fig.3a

Fig.3b

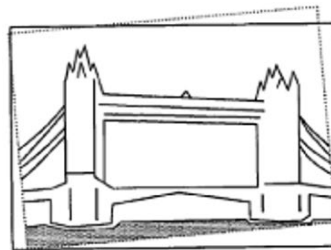


Fig.3c

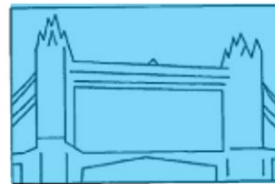


Fig.3d



Fig.3e

That Thomason discloses an alternative embodiment in FIG. 5 (with a fixed size viewing window) does not change the conclusion that Thomason’s FIG. 3 discloses a viewing window with a dynamic size. (EX1019, ¶¶48-49.)

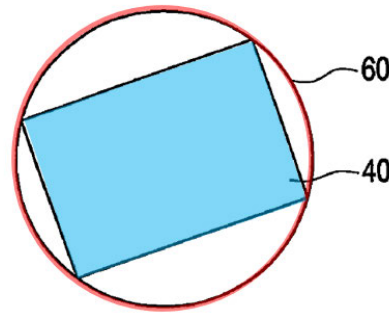
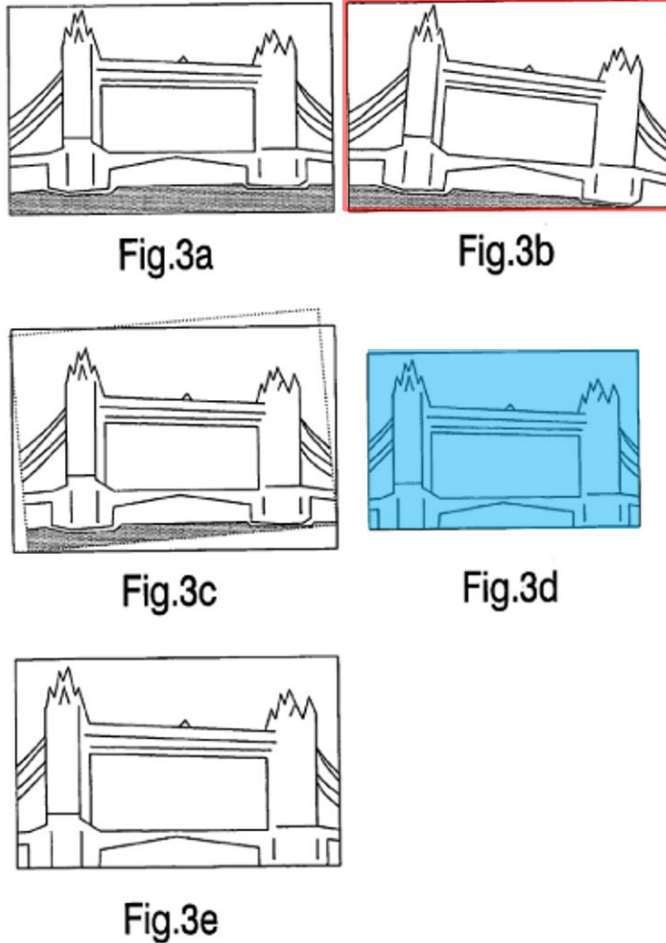


Fig.5

C. The Thomason-Pacurariu system teaches “simulating changes in zoom” (claims 8 and 18).

GoPro contends that “Petitioner suggests that this limitation [in claims 8 and 18] is met simply by changing the size of the viewing window.” (POR, 64). But this is exactly what GoPro argued in the ITC litigation. (ITC ID, 148 (ALJ finding “when the viewing window is smaller or larger, and then fitted to an output viewing space, this necessarily results in changes in zoom. . . . This is also consistent with GoPro’s arguments on the technical prong of domestic industry and infringement”).)

Regardless, the Petition provided different mappings for different claims. It cites Thomason’s *FIG. 3d* for claim 7 and *FIG. 3e* for claim 8. Regarding claim 8, the Petition explains that Figure 3d is resized to Figure 3e and that “[c]omparing to Figure 3a (the original image, below), the scene in Figure 3e appears more zoomed-in because the objects appear larger.” (Petition, 39; EX1019, ¶50.) The ALJ agreed. (ITC ID, 162-163.)



GoPro’s position that the claims require a “smoothed zoom curve” is meritless. (*Supra* § II.C.) Even adopting GoPro’s position, Pacurariu discloses that “the tilt angle data may be filtered or *smoothed* . . . on a plurality of the tilt angle data.” (EX1005, [0066]). Thus, Pacurariu discloses calculating smoothed rotation data, which would result in a smoothed/gradual change in the viewing window size and thus a “smoothed” zoom effect. (EX1019, ¶51.) Dr. Foroosh omitted this disclosure in his analysis. (EX1018, 209:5-12.)

D. The Thomason-Pacurariu system teaches determining a “location” (claims 10 and 20).

GoPro’s construction requiring determination of an x-y coordinate that changes across frames fails. (*Supra* § II.D.) Regardless of whether “location” is a point or an area, the Thomason-Pacurariu system determines the viewing window’s location on a frame-by-frame basis. (EX1019, ¶¶52-53.)

GoPro’s argument that Thomason and Pacurariu do not change the location of the viewing window as it is always centered lacks merit. Claims 10 and 20 do not require “change.” Regardless, Thomason’s viewing window in FIG. 3d appears not perfectly centered with respect to the original image, thus meeting GoPro’s construction. (EX1019, ¶54.)

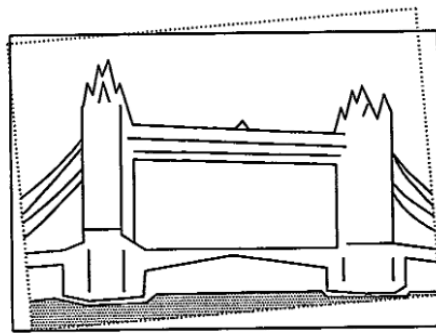


Fig.3c

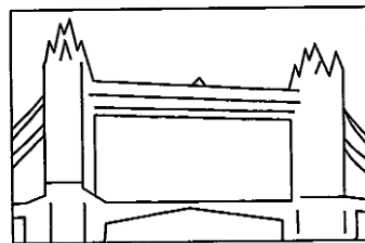


Fig.3d

E. A POSITA would be motivated to combine Thomason and Pacurariu.

The Board rejected GoPro’s argument of lack of motivation to combine Thomason and Pacurariu. (ID, 33-35.) It found “great similarity of the references’

technology” and a POSITA “would have understood that Pacurariu’s teachings would have predictably improved Thomason.” (ID, 34-35.)

GoPro’s purported reproduction of “the entirety of Petitioner’s analysis” ignores significant portions of the Petitioner’s analysis. (EX1019, ¶¶55-56.) As discussed, to the extent that Thomason does not explicitly disclose storing frame-specific rotation data as “metadata” and when to retrieve it in the frame-by-frame analysis, Pacurariu teaches that. (*Id.*) The combination “would yield predictable results of effectively and efficiently horizon-leveling video data.” (Petition, 23). And a POSITA would understand a finite number of ways to store frame-specific rotation data: as metadata or in a separate database. (EX1019, ¶57.) Pacurariu states that “[t]he tilt angle data may be saved as metadata within a separate file or as part of each video frame.” (EX1005, [0052]). There are clearly design incentives for an efficient horizon-leveling algorithm. (EX1019, ¶57.)

The rest of GoPro’s arguments hinge on a false premise—that Thomason is an “accelerometer-only” system and is “mostly stationary.” These are plainly contradicted by Thomason. (*Supra* § III.A.) GoPro’s argument that Thomason and Pacurariu are directed to devices “having entirely different movements” is meritless because both systems are designed for mobile phones. (EX1019, ¶¶58-60.) Like Thomason, Pacurariu teaches multiple sensors, including “an accelerometer, gyroscope, and/or magnetometer” such as a “a nine-axis

accelerometer that includes a gyroscope and a magnetometer.” (EX1005, [0026], claim 5.)

GoPro argues that the combination cannot “overcom[e]” problems regarding synchronization of the position and video data, but the claims require no “synchronization.” (*See also* ITC ID, 160 (“the claim does not require the type of synchronization GoPro demands”).) Regardless, both references disclose synchronization by associating rotation information with corresponding video frames. (EX1019, ¶61; EX1004, [0035]; EX1005, [0052].)

IV. GROUND 2: THOMASON, PACURARIU, AND WATANABE (CLAIMS 3-6, 13-16)

A. The combination teaches “the distortion of the visual content reducing impact of an off-axis horizon depicted within the horizon-leveled visual content” (claims 3 and 13).

GoPro’s position—that this limitation requires more than the mere existence of a distortion—contradicts its position before the ITC. Before the ITC, GoPro ignored this “off-axis” limitation entirely, let alone identifying any accused algorithms resulting in any off-axis horizon. (*See* EX1017, 269:14-20 (GoPro expert skipping this limitation).) GoPro should not be allowed to take an inconsistent position here.

The ’832 patent discloses that if a distortion exists, the impact of an off-axis horizon would be reduced: “[e]xistence of such distortion(s) within an image may create curves within the image, which may make an off-axis horizon less

noticeable than in an image without distortion.” (EX1001, 22:15-18 and FIG. 7.)

It discloses no additional processing. (EX1019, ¶¶62-64.) Dr. Foroosh also agreed that “the existence of distortion makes off-axis horizon less noticeable.” (EX1018, 111:12-112:1.)

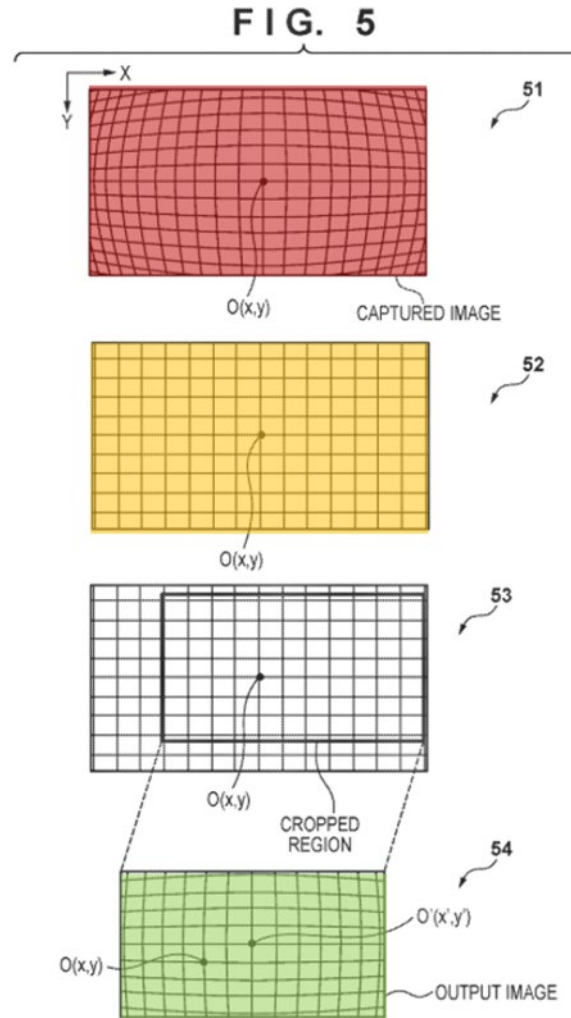
In the proposed combination, image 54 of Watanabe is a distorted image that has been horizon-leveled based on the teachings of Thomason and Pacurariu. (EX1019, ¶65.) A POSITA would understand that the existence of distortion in image 54 would reduce the impact of an off-axis horizon depicted in the image. (*Id.*)

Contrary to GoPro’s assertion that “Thomason and Pacurariu do not address[] the problem of an off-axis horizon,” horizon-leveling is the very purpose of both references. (EX1004, Abstract; EX1005, Abstract.) Horizon-leveling in Thomason and Pacurariu may be imperfect, thereby resulting in an off-axis horizon. (EX1019, ¶¶66-67.) Thomason states that its rotation sensor may provide “an output representing the angle of the captured image to the horizontal to ***an accuracy of 5° or better.***” (EX1004, [0004].) Similarly, Pacurariu describes various rotation sensors and states “the tilt angle data may be filtered or smoothed.” (EX1005, [0059], [0066].)

B. The combination teaches “the visual content includes a distortion” (claims 3, 13).

GoPro’s narrow construction that the claims require a distortion to be part of the “original visual content” fails. (*Supra* § II.B.) Regardless, the combination discloses a distortion in the visual content before ***and*** after horizon-leveling. As shown in FIG. 5 of Watanabe, both image 51 (a captured image) and image 54 (the horizon-leveled image) contain distortion. (EX1019, ¶68.)

Even assuming claim 3 requires a distortion to “remain,” this is also taught. (EX1019, ¶¶69-73.) GoPro is incorrect that Watanabe always removes a distortion and reintroduces a “significantly different” distortion. (POR, 18.) Rather, the same distortion can be reintroduced. For example, Watanabe teaches that “[a] distortion addition circuit 108 reads out . . . ***adds the effect of distortion caused by the photographing lens 102 to this image.***” (EX1006, 5:36-41; FIG. 1.)

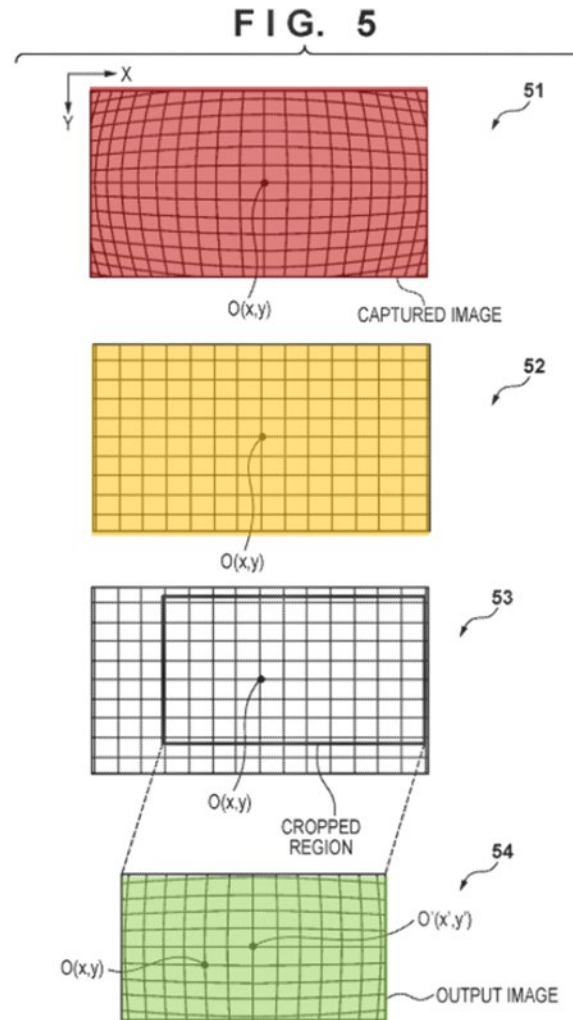


Per Watanabe, the ***amount*** of distortion can be the same: “[t]he degree of a distortion effect that is added by the distortion addition circuit 108 can be appropriately determined in a range ***not exceeding the intensity of distortion caused by aberration of the photographing lens 102.***” Dr. Foroosh testified that “not exceeding” means “not going beyond something.” (EX1018, 178:15-179:25.) Thus, the amount of distortion can be equal to the original distortion. (EX1019, ¶71.)

Watanabe also teaches that the *center* of the distortion can be the same, disclosing that “*the image shake correction amount is 0.*” (EX1006, 11:33-36.) In this case, the centers of the distortions would match. (EX1019, ¶72.) FIG. 5 is a specific example to illustrate a scenario in which the image shake correction is not 0, but Watanabe’s disclosure is not limited to FIG. 5.

C. The combination teaches “the visual content includes the distortion based on application of the distortion to non-distorted visual content” (claims 6, 16).

GoPro does not dispute that image 54 includes applied distortion. GoPro’s argument that image 54 does not contain “the visual content” based on its improper claim construction should be rejected. (*Supra* § II.B.; EX1019, ¶74.)



D. A POSITA would be motivated to combine Watanabe with the Thomson-Pacurariu system.

GoPro's argument that a POSITA would not be motivated to combine Watanabe with Thomason/Pacurariu incorrectly assumes that Thomason/Pacurariu are limited to processing non-distorted images. The Thomason-Pacurariu system can be used to horizon-level images, distorted or non-distorted. (EX1019, ¶¶75-76.) At the time of the invention, distorted images were commonly produced by cameras. (EX1006, 9:33-44 (wide-angle lenses introducing distortion were

known); ITC ID, 165.) Dr. Foroosh also testified that amateur cameras such as action cameras may have different types of lenses “depend[ing] on the manufacturer’s design” and that “wide angle camera would introduce some non-linear distortions[.]” (EX1018, 40:8-16, 41:11-17.) Nothing in Thomason or Pacurariu limits horizon leveling to non-distorted images. (EX1019, ¶¶75-76.)

A POSITA would understand lens distortions, such as barrel and pincushion distortions, can cause nonlinear stretching or compression of images. Rotating a distorted image can introduce warping and interpolation errors. Watanabe solves the problem by removing distortion, performing image correction, and reintroducing the distortion. (EX1019, ¶¶77-78.) That Watanabe’s image correction may crop an image off-center sometimes is irrelevant to the combination. (*Id.*)

A POSITA would have been motivated to combine Thomason, Pacurariu, and Watanabe because they are all related to the same technical problem (correcting for camera motion) and the same general solution (using rotational data to correct for camera motion). (EX1019, ¶¶79-82.) A POSITA would understand that horizon leveling involves compensating for the tilt of the image/video. (*Id.*; EX1001, 6:37-41, 9:37-39, 9:15-19.) Watanabe teaches that its techniques can be applied to “mobile phones.” (EX1006, 3:61-4:3.) It further discloses correction of “*tilt* components of shake[.]” (*Id.*, 5:26-32.) And Dr. Foroosh concedes that both

horizon-leveling and Watanabe involved correcting for tilt. (EX1018, 46:14-19; 113:11-15; 148:5-10.)

The combination of Thomason and Pacurariu, when processing a distorted image, disclose claims 3-5 and 13-15. (EX1019, ¶83.) The combination of Thomason, Pacurariu, and Watanabe discloses claims 3-6 and 13-16. (*Id.*)

V. GROUND 3: VOSS AND DERBANNE (CLAIMS 1, 2, 7-12, 17-20)

A. The Voss-Derbanne system discloses determining a “viewing window” (all claims).

GoPro raises several meritless issues about Voss. It argued that it is unclear what the “inset rectangle” is. (POR, 49.) The Petition cannot be clearer by color-coding the inset rectangle in blue in the text and in FIG. 2. The description in Voss is also clear, stating that “[t]he inset rectangle 225 is transformed to compensate for rotation 220, 230, 240 by essentially rotating in the inverse of the device’s own rotation.” (EX1007, 10:5-7.) This language refers to the blue box rather than the red box. (EX1019, ¶ 85.) When asked about the relationship between the blue box and the device, Dr. Foroosh agreed “there is relative rotation between them.” (EX1018, 190:4-191:8.) GoPro’s argument that the blue-shaded box is not the inset rectangle as it does not change aspect ratios fails. Voss does not require the inset rectangle to change aspect ratios. (EX1019, ¶¶84-86.)

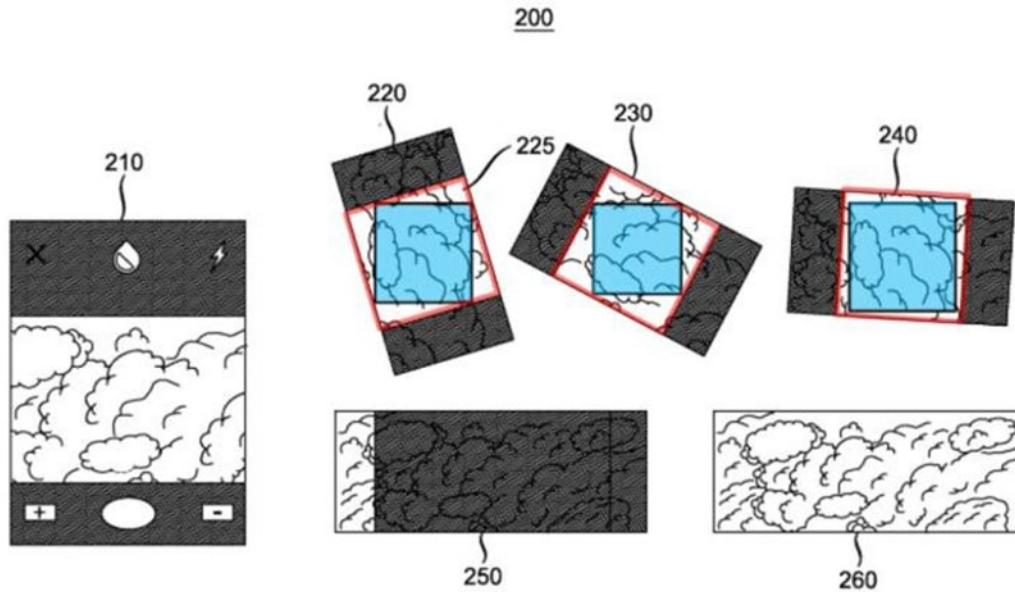


FIG. 2

GoPro's argument that the clouds depicted in FIG. 2 appear to rotate with the device is a red herring. The Petition provides a better rendering of FIG. 2 from a related application of Voss, in which the clouds in the inset rectangle 225 have substantially the same orientation despite rotation of the device. (EX1002, ¶171; EX1013, FIG. 2; EX1019, ¶87.)

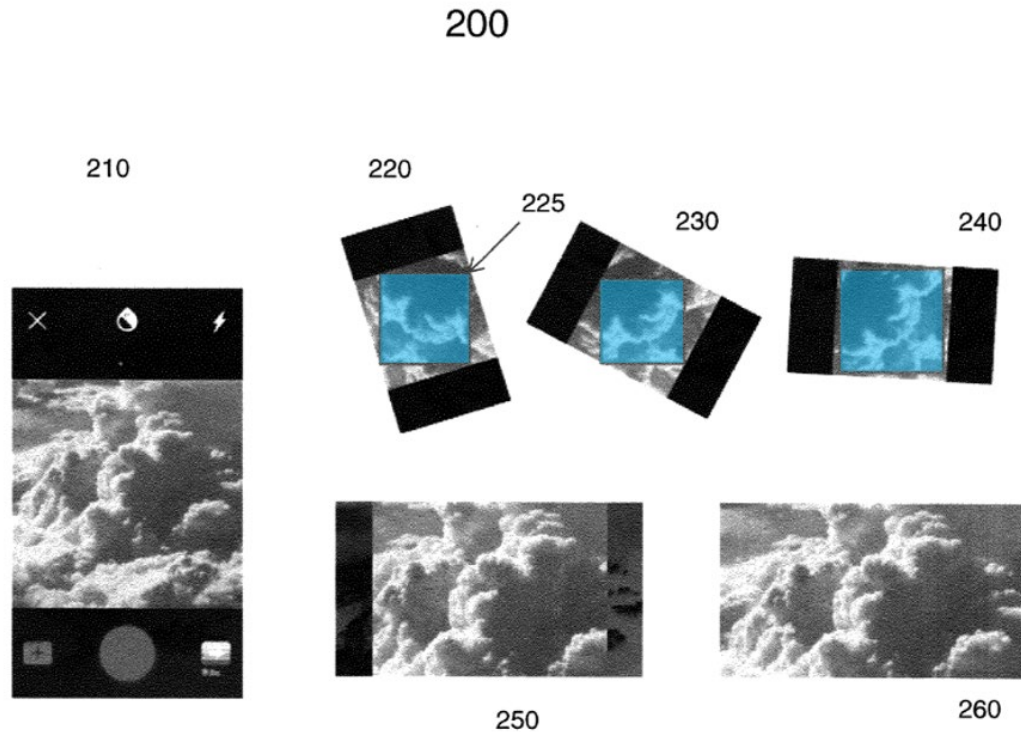


FIG. 2

Nor is there “serious confusion” in the Written Opinion. (POR, 50.) In paragraph 3.2, the Office merely points out that the insect rectangle in FIG. 2 appears to be a square. The Office never expressed confusion as to what the inset rectangle is. Regardless, a square is a rectangle. (EX1019, ¶88.) In paragraph 4, the issue raised relates to claims, not Voss’ disclosure. (*Id.*; EX2030, 7.)

GoPro’s allegation that Voss “simply distinguish[es] between a vertical and horizon orientation” is misplaced. Voss’ technique is more granular than binary processing. FIG. 2 would not be possible if the rotation measurement is binary (i.e., vertical and horizontal). (EX1019, ¶89.) Further, Voss states “[t]he inertial

sensor is for determining *rotational values*.” (EX1007, 3:22-23.) Voss describes synchronization techniques “to provide more accurate positional information in time with the video.” (EX1007, 16:23-17:2; *see also* FIGs. 6-7.)

GoPro’s argument that the inset rectangle in Voss is not a “viewing window” because it does not “equate” the horizon-leveled visual content also fails. (EX1019, ¶90.) Contrary to GoPro’s suggestion, the claims require that the horizon-leveled visual content only *include* the visual content defined by the viewing window. (*Supra* §II.A.) Voss discloses it. Specifically, “[i]f the optimal output dimension is 4:3 and the sampled rectangle is 1:1, the sampled rectangle would either be aspect filled (fully filling the 1:1 area optically, cropping data as necessary) or *aspect fit (fully fitting inside the 1:1 area optically, blacking out any unused area with 'letter boxing' or 'pillar boxing'*.” (EX1007, 10:17-21.) The output includes the rectangle. Dr. Foroosh testified that he omitted the second half of the sentence in his analysis. (EX1018, 196:5-12.)

A POSITA would understand: (1) by using letter/pillar boxing, Voss’s output box would include the entire inset rectangle because letter/pillar boxing is not cropping and (2) the output box would equate to the inset rectangle if their aspect ratios are the same. Thus, the final output includes the entire inset rectangle. (EX1019, ¶91.)

Additionally, Derbanne discloses this limitation. FIG. 6B of Derbanne illustrates punch-outs 614 and 624, and Derbanne teaches that “[v]ideo content is generated based on visual content of the images within the punch-outs.” (EX1008, Abstract.) GoPro’s lone argument against Derbanne is that Derbanne is directed to video stabilization. (POR, 61.) But the proposed combination involves punching out (as taught by Derbanne) the visual content defined by Voss’ inset rectangle and generating video content accordingly, not video stabilization. (EX1019, ¶¶92.)

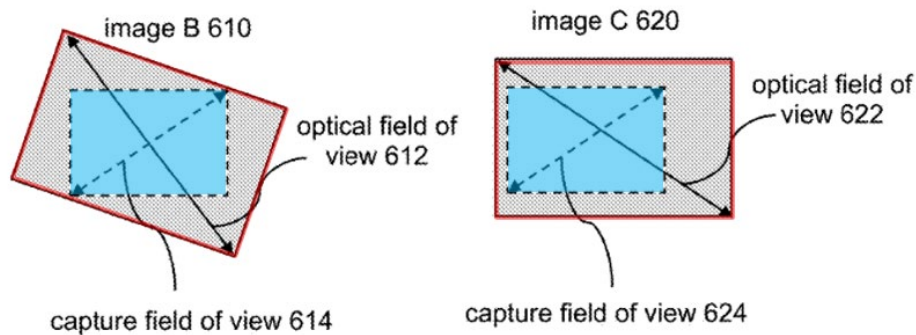


FIG. 6B

B. The Voss-Derbanne system discloses determining a “size of the viewing window” (claims 7, 17).

GoPro’s argument that FIG. 2 of Voss does not disclose a dynamically changing size for the inset rectangle fails. Dr. Foroosh testified that the rightmost blue box “appears larger than the other two” and that the middle one “looks smaller.” (EX1018, 191:21-192:8.) Dr. Foroosh’s own observation contradicts his supplementary declaration. (EX1019, ¶¶93-94.)

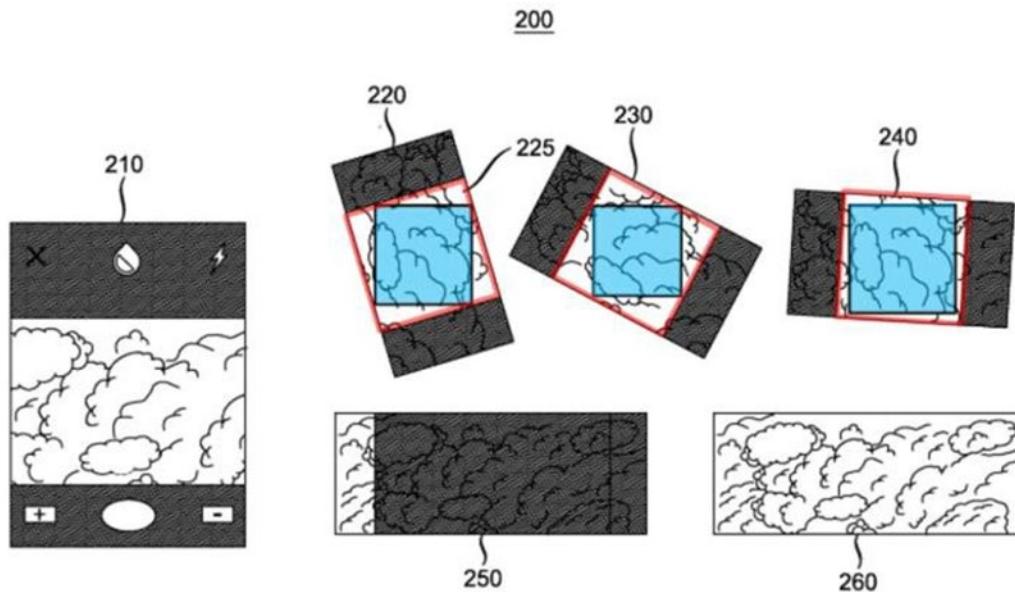


FIG. 2

Voss states that “[t]he transformed inner rectangle 225 is *inscribed optimally* inside the maximum available bounds of the overall sensor minus the padding.” (EX1007, 10:7-9.) The inset rectangle can also change in aspect ratio. (*Id.*, 10:9-11; EX1019, ¶95.) Voss’s inset rectangle changes in size.

C. The Voss-Derbanne system discloses “simulate changes in zoom” (claims 8, 18).

GoPro’s argument again hinges on the false premise that Voss’s inset rectangle is cropped for output. (POR, 63-64.) But Voss discloses an output containing the entire inset rectangle (potentially plus letter/pillar boxing). (EX1019, ¶¶96-98.) Thus, Voss’s disclosure of zoom applies to both its “output box” and “inset rectangle.”

GoPro’s claim differentiation argument fails because the Petition provided different mapping for different claims. (Petition, 76-77; EX1019, ¶99.)

GoPro’s argument that the claims require modifying the size of the viewing window “for the purpose of simulating changes in zoom” is baseless. The claim does not recite “for the purpose of.” Even assuming that it does, a POSITA would understand that, in Voss, rotating the device can be done for the purpose of simulating changes in zoom. (EX1019, ¶100.)

D. The Voss-Derbanne system discloses determining a “location” of the viewing window (claims 10, 20).

Regardless of whether “location” is a point or an area, the Voss-Derbanne system determines where the viewing window is on a frame-by-frame basis. (EX1019, ¶101.) Dr. Foroosh agreed that the blue boxes “cover different portions of the clouds.” (EX1018, 192:17-20.)

Further, contrary to GoPro’s assertion, the location of the viewing window in the Voss-Derbanne system is not always centered. Dr. Foroosh conceded as much. (EX1018, 193:4-9; 208:2-7.) Voss discloses an uncentered viewing window 440 in FIG. 4. Derbanne provides a similar example. (EX1019, ¶102.)

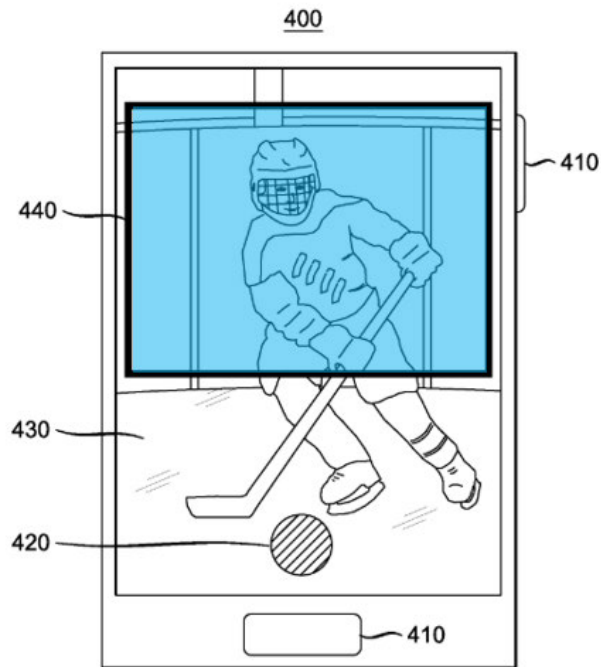


FIG. 4

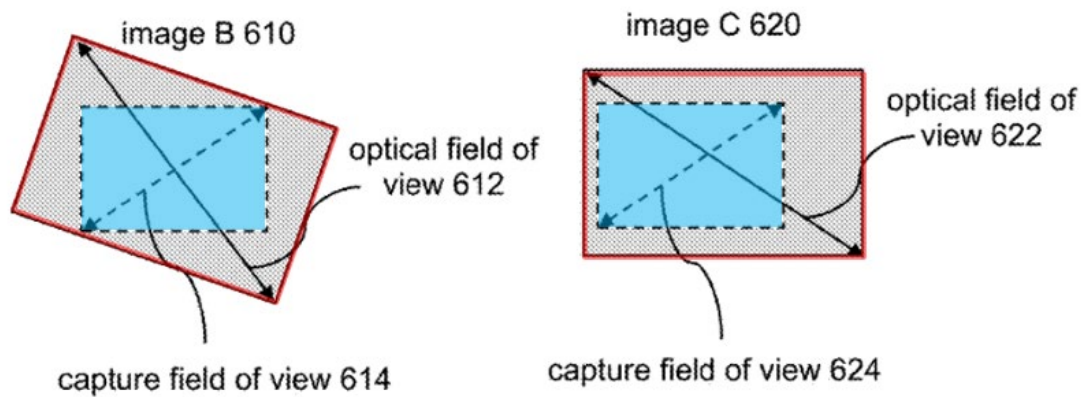


FIG. 6B

E. A POSITA would be motivated to combine Voss and Derbanne (all claims).

The Board rejected GoPro's argument of lack of motion to combine. (ID, 45-46.) GoPro's argument that Derbanne cannot be combined with Voss because

it concerns stabilization is unavailing. Both Derbanne and Voss involve motion correction. Derbanne also discloses correcting motion in three axes, including in the roll direction. A POSITA would understand that horizon leveling—such as disclosed in Voss—compensates motion in the roll direction. (EX1019, ¶¶103-104.)

The Petition relies on Derbanne’s disclosure for limitations related to format of the video content and rotational position information, as well as the “punchout” for visualizing the processed data. (Petition, 61-62.) The Voss-Derbanne combination is obvious to try because there are a finite number of solutions for obtaining and storing video data and corresponding rotational data. (EX1019, ¶¶105-107.) For example, video data may be stored as a series of images or in a compressed format, and the associated rotational data can be stored in different formats accordingly. (*Id.*, ¶107.) The teachings of Derbanne related to formatting of video data and rotational data can help a POSITA implement Voss’ horizon-leveling algorithm. (*Id.*) Dr. Foroosh agreed with this point, stating with reference to Derbanne that “[w]e’re compensating translation and rotations. We are doing the same things.” (EX1018, 205:1-14.)

VI. GROUND 4: VOSS, DERBANNE, AND WATANABE (CLAIMS 3-6, 13-16)

GoPro’s arguments fail for the same reasons discussed for Ground 2. Integrating Watanabe results in an improved image processing pipeline, in which

distortion is removed to allow for accurate image correction (including horizon-leveling) and then added back. (EX1019, ¶108.)

VII. THE OBJECTIVE EVIDENCE DOES NOT SUPPORT NON-OBVIOUSNESS

A. GoPro fails to show it practices the '832 patent

Claims 3-4. GoPro is silent on how “the distortion of the visual content reducing impact of an off-axis horizon” in HERO9 (POR, 72-73) despite accusing Petitioner of relying on “conclusory assertion of its expert.” (*id.*, 16; EX1019, ¶113-114.)

Claims 7-8. GoPro does not explain how HERO9 “simulate[s] changes in zoom” (POR, 73) despite arguing that this limitation “includes a requirement that the resizing accomplish a controlled zooming effect.” (*Id.*, 33; EX1019, ¶115.)

Claims 2, 5-6, 9-20. GoPro does not argue any product practices these claims.

B. There is no nexus.

GoPro does not argue any presumption of nexus. Indeed, it makes no attempt to show how the purported practicing product HERO9, which includes a myriad of other features, are “coextensive with” the challenged claims. (ID, 52.) *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019).

Nor does GoPro show that any purported objective indicia is the “*direct result* of the *unique* characteristics of the claimed invention.” *Fox Factory*, 944

F.3d at 1374; *see also* Paper 24, 73 (referring to “direct nexus”); ID, 54; EX1019, ¶¶117-120. It fails to identify any secondary consideration attributable to horizon leveling, let alone the claimed inventions. (POR, 4-6 (arguing novelty involves obtaining “rotational position information . . . as a function of progress through the capture duration,” “determine[ing] a viewing window . . . as a function of progress through the progress length,” “a viewing window that is dynamic in size,” and “introducing distortion to the image that is horizon leveled”); ITC ID, 151.)

As the Board noted, “the evidentiary ties to the ’832 patent are slim and the evidence supports that many unclaimed competing factors also contribute to success of GoPro products.” (ID, 54.) GoPro’s surveys show lack of nexus. (EX2018, 23; EX2019, 14; EX1019, ¶120.) And its witness, Mr. Lema, concedes that [REDACTED]

[REDACTED] (EX2024 ¶16-17, 21, 24; *see also* EX2040, 5.)

C. No objective indicia of non-obviousness

No commercial success / praise. GoPro’s exhibits undercut its argument. (EX1019, ¶121.) They show that the purported commercial success is attributed to many factors unrelated to horizon leveling. (EX2018, 23; EX2019, 14; EX2040, 5.) And the purported success of “horizon leveling” in general is not linked to the claimed techniques. (ITC ID, 151.) GoPro points to no praise.

No copying. GoPro's alleged copying evidence based on Petitioner's '444 Chinese application has been rejected by both the Board and the ITC. (ID, 53; ITC ID, 151-152.) There is no evidence of replicating GoPro's technology. (EX1019, ¶122; EX1022, 159:14-160:3 (no documents showing copying).) Instead, Petitioner independently developed horizon leveling. (EX1023, 257:11-259:2, 259:11-17, 261:4-5, 261:12-22; EX1024, 244:3-12, 245:2-14 (no copying).) Indeed, the ALJ found that Insta360's own horizon leveling technology invalidated all asserted claims of the '832 patent. (ITC ID, 140-152.)

Nor is benchmarking copying, as GoPro's witness concedes. (EX1025, 386:9-14; EX1019, ¶123.) Its witness also confirmed GoPro regularly tore down Insta360 products. (EX1025, 388:24-389:2, 390:3-391:24.)

No long-felt but unmet need. GoPro does not argue any unmet need. (EX1019, ¶124.) Its own witnesses are aware of none. (EX1022, 150:20-151:9; EX1026, 66:18-67:15.)

No unexpected results/failure of others. GoPro does not any unexpected results. (EX1019, ¶125.) [REDACTED]
(EX1026, 66:18-67:3.)

VIII. CONCLUSION

Petitioner requests cancellation of claims 1-20 of the '832 patent.

IPR2024-01052

Dated: July 14, 2025

Respectfully submitted,

By: /s/ Lily Yue Li

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Certification of Word Count (37 C.F.R. § 42.24)

I hereby certify that this PETITIONER’S REPLY TO PATENT OWNER RESPONSE has 5,495 words (as counted by the “Word Count” feature of the Microsoft Word™ word-processing system), exclusive of “a table of contents, a table of authorities, a listing of facts which are admitted, denied, or cannot be admitted or denied, a certificate of service or word count, or appendix of exhibits.”

Dated: July 14, 2025

By /s/ Lily Yue Li
Lily Yue Li

Certificate of Service (37 C.F.R. § 42.6(e)(4))

I hereby certify that the attached PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE was served as of the below date on the Patent Owner via e-mail (by agreement) to the following counsel of record:

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Dated: July 14, 2025

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