

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VALVE CORPORATION,
Petitioner,

v.

IMMERSION CORPORATION,
Patent Owner.

Case IPR2024-00557
Patent 10,665,067

**PATENT OWNER'S PRELIMINARY RESPONSE
UNDER 35 U.S.C. §§ 311-19 AND 37 C.F.R. § 41.100, ET SEQ.**

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EXHIBIT LIST

Exhibit No.	Exhibit Description
2001	Declaration of Craig Rosenberg, Ph.D. in Support of Immersion Corporation's Patent Owner Preliminary Response, dated May 15, 2024
2002	<i>Curriculum Vitae</i> of Craig Rosenberg, Ph.D.
2003	<i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-000712-TL, Joint Claim Construction Statement (Exhibit A), Dkt. # 68-1
2004	<i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-000712-TL, Order on Motion to Stay Pending <i>Inter Partes</i> Review, Dkt. # 69
2005	<i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-000712-TL, Case Scheduling Order, Dkt. # 46
2006	<i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-000712-TL, Valve Corp.'s Invalidity Contentions

I. INTRODUCTION

Patent Owner Immersion Corporation (“Immersion”) respectfully requests the Board to deny institution of this Petition as it fails to demonstrate a reasonable likelihood that Petitioner Valve Corporation (“Petitioner”) will succeed in showing that the Challenged Claims of Immersion’s U.S. Patent No. 10,665,067 (EX1001 or the “’067 Patent”) are unpatentable.

The ’067 Patent is directed to systems and methods for integrating haptics overlay in augmented/virtual reality (AR/VR) for enhancing user experience in AR/VR environments by providing improved haptic feedback and visual effects, thereby providing a more immersive AR/VR experience for the user. The inventors of the ’067 Patent sought to address the challenges of enhancing user interaction and feedback in virtual or augmented reality environments. The ’067 Patent teaches a solution to overcome these challenges with a system that includes a proxy object comprising a haptic output device, a sensor for tracking the position of the proxy object, a display for visual effects, and a processor for determining and outputting modified visual effects as well as haptic effects based on position data from the sensor.

The ’067 Patent’s proxy object includes real-world objects such as wearable peripheral devices that serve as a proxy for a virtual object. And by overlaying visual effects over the proxy object such as in AR/VR environments, the ’067 Patent

bridges the disconnect between virtual experiences and physical interactions, which allows users to see, touch, and interact with virtual items or environments as if they are real. Thus, in the '067 Patent, position of the proxy object is not only used for visual overlay to display a virtual object, but also to provide haptic feedback through the proxy object to provide a more immersive interaction with the virtual environment.

In contrast, the prior art Petitioner asserts are all directed to systems that utilize position tracking sensor data *only* for overlaying visual effects on physical objects to display images of corresponding visual objects. For example, Petitioner asserts Banerjee and Meglan, which are both references directed to the simulation of hands-on medical treatment. Banerjee is directed to a surgical simulation workstation for simulated training for brain aneurysm clipping, and Meglan is directed to simulated training for hemorrhage control techniques such as the use of tourniquets. Petitioner also asserts a third reference, Rogers, which is directed to a virtual reality system employing a physical controller such as a gun that can be depicted as a virtual weapon and a head mounted display (HMD) unit through which the user can view the virtual environment, e.g., of a video game, as well as a simulated or virtual image of the gun overlayed on the physical weapon.

Though Banerjee and Meglan utilize a camera sensor for tracking the position of certain objects, neither disclose the use of such position tracking sensor data to

enable ***haptics***. Rather, as explained in detail below, the camera sensor is only used for overlaying visual effects, but not for enabling haptics. This is because the prior art was only concerned with ensuring low latency in the ***visual*** overlay as opposed to also recognizing the importance of further position tracking for the purpose of providing haptic effects to enhance feedback. Instead, these prior art systems employed force feedback mechanisms that relied on detecting physical contact to provide feedback effects. Petitioner's mapping of the Challenged Claims to the Rogers reference is also directed to the use of camera sensors only for overlaying visual effects. Indeed, Petitioner's mapping to Rogers does not disclose the use of cameras to enable haptic feedback.

Accordingly, as detailed in this Preliminary Response, all grounds of the Petition commonly suffer from a key deficiency, which is the failure to disclose haptics that depend on the position of the claimed proxy object as claimed by the '067 Patent. In addition, Petitioner fails to prove that Banerjee discloses "a proxy object comprising one or more haptic output devices" and "a modified visual effect displayed on the proxy object" as claimed in the '067 Patent. Petitioner also fails to prove that Rogers discloses the claim limitation "determine a modified visual effect" based on the same sensor used for haptic feedback as required by the '067 Patent. Therefore, the Board should deny institution of the Petition.

II. IMMERSION CORPORATION—A PIONEER IN HAPTICS TECHNOLOGY

Immersion Corporation is a publicly-traded company, and since its founding 30 years ago, has been the global leader in developing haptic technology as well as licensing software solutions and intellectual property for enabling haptic interfaces in a broad array of product markets including wearable devices, mobile ads and video, mobile devices, medical applications, automotive interfaces, gaming and virtual reality. Over 3 billion devices are licensed to use Immersion's haptic feedback software and intellectual property.

Started in 1993 by Louis Rosenberg, a pioneer in sensing interfaces and feedback technology, Immersion developed and commercialized haptic innovations, allowing devices to provide tactile sensations to enhance user interactions. Immersion was one of the first companies to release haptic joysticks, computer mice and steering wheels for video games. This technology has been widely used in gaming controllers, medical simulators, and other applications to enhance realism and user engagement.

Immersion's industry-defining technology is used in over three billion devices worldwide, including tablets, smartphones, wearables, gaming controllers, and automotive interfaces. The Institute of Electrical and Electronics Engineers ("IEEE") has recognized Immersion in its annual IEEE Spectrum Patent Power

scorecards, which evaluate the technology world's most valuable patent portfolios by quantitative benchmarks. Immersion's established and growing leadership in haptic technology is reflected by its consistent ranking in the top 20 in its industry segment.

Immersion's technological advances in the haptics space has generated over 3,500 issued patents world-wide. Immersion's patents have been proven novel through multiple challenges over the years. Exclusive of those brought by Petitioner, Immersion's patents have been challenged in 43 IPRs¹ of which only 2 cases² have resulted in determinations of unpatentability.

III. BACKGROUND

A. Overview of the '067 Patent

The '067 Patent is directed to a system that includes a proxy object with one or more haptic output devices, a display for outputting visual effects onto the proxy object, a sensor for tracking the proxy object's position, and a processor configured

¹10 of these IPRs were denied institution, 14 of them were terminated prior to an institution decision in light of settlements, while 19 of them were instituted with 17 of those terminated prior to a final written decision in light of settlements.

²*Apple Inc. v. Immersion Corp.*, IPR2016-01372, Paper 35 (Jan. 10, 2018) and *Apple Inc. v. Immersion Corp.*, IPR2016-01381, Paper 36 (Jan. 10, 2018).

to modify visual effects displayed on the proxy object and to output haptics, both based on its position. EX1001, Abstract, 1:27-49.

The '067 Patent aims to solve the challenges of enhancing user interaction with virtual or augmented reality environments and addresses the need for a more immersive experience in such environments. *Id.*, 1:13-23. The '067 Patent solves this problem by integrating haptic feedback and visual effects. *Id.*, Abstract, 1:27-49. Specifically, the patented system includes a proxy object that comprises haptic output devices, a display for visual effects, a sensor for tracking the position of the proxy object, and a processor that determines and outputs modified visual and haptic effects based on position data from the sensor. *Id.*

A proxy object can include a real-world object such as a wearable peripheral device that acts as a proxy for a virtual object. *Id.*, 2:30-33. By using proxy objects in conjunction with overlaying visual effects such as in AR/VR environment, the '067 Patent bridges the disconnect between virtual experiences and physical interactions, which allows users to see, touch, and interact with virtual items or environments as if they are real. *See, e.g., id.*, 2:30-3:8; 5:23-6:29; 6:52-7:32; 8:16-33.

This system further allows users to have a tactile experience by way of haptic feedback based on the position of the proxy object, such as feeling the texture of the proxy objects, that corresponds with what they see in the augmented or virtual reality

environment, thereby making the interaction with virtual content more realistic and engaging. *Id.*, 1:3-49, 2:30-64.

B. Claims of the '067 Patent

Petitioner challenges Claims 1-8, 11-12, 15-21 of the '067 Patent. Exemplary independent Claim 1 is recited below:

1[pre]. A system comprising:

[1A] a proxy object comprising one or more haptic output devices;

[1B] a display configured to output a visual effect onto a surface of the proxy object;

[1C] a sensor for tracking a position of the proxy object; and

[1D] a processor configured to:

[1D-1] determine a modified visual effect based in part on data received from the sensor; and

[1D-2] determine a haptic effect based in part on data received from the sensor;

[1D-3] transmit a display signal associated with the modified visual effect to the display, the modified visual effect to be displayed on the proxy object via the display

[1D-4] transmit a haptic signal associated with the haptic effect to the one or more haptic output devices; and

[1D-5] output the haptic effect using the one or more haptic output devices.

C. Prosecution History of the '067 Patent

The application that later issued as the '067 Patent was filed on June 15, 2018. EX1002, 40. The Patent Office rejected the original claims under Section 103 in an Office Action dated July 5, 2019. *Id.*, 74-103. The Patent Office rejected claims 9 and 19 under 35 U.S.C. Section 112(a) as failing to comply with the written description requirement. *Id.*, 76. Additionally, claims 1-7, 9-17, and 19-21 were rejected under 35 U.S.C. Section 103 over Gonzalez et al. and Rimon (U.S. Patent Application Publication No. 2016/0274662). *Id.*, 77-99. Claims 8 and 18 were similarly rejected in further view of Vanslette et al. (U.S. Patent Application Publication No. 2018/0040038). *Id.*, 99-102.

Applicant filed a response on October 7, 2019, traversing the Section 112 rejection. *Id.*, 128-29. Applicant also made certain amendments to the claims as shown below. *Id.* at 124-27, 129-131.

1. A system comprising:
 - a proxy object:
 - sensor;
 - a haptic output device mechanically coupled to the proxy object;
 - a display configured to output a visual effect onto a surface of the proxy object;
 - a sensor for tracking a position of the proxy object; and
 - a processor configured to:
 - determine a modified visual effect based in part on data received from the sensor;
 - determine a haptic effect based in part on data received from the sensor;
 - transmit a display signal associated with the modified

visual effect to the display;
transmit a haptic signal associated with the haptic effect to
the haptic output device; and
output the haptic effect using the haptic output device.

Id., 124. The other independent claims were similarly amended. *Id.*, 125-27.

The Patent Office issued a Final Office Action on November 22, 2019, maintaining the Section 112(a) rejection of claims 9 and 19 and further rejecting amended claims 1, 11, and 21 under the same. *Id.* at 137-38. The Final Office Action maintained the Section 103 rejections. *Id.*, 139-67.

An Examiner Interview was held on January 10, 2020, discussing a proposed amendment and the cited art for Gonzalez and Rimon. *Id.* at 253. The Examiner indicated that the proposed amendment would overcome the cited art. *Id.*

Applicant submitted a response to Final Office Action on January 22, 2020, amending certain claims to address the rejections under Sections 112 and 103. *Id.*, 258-60. Specifically, Applicant amended the “haptic output device” limitation of claim 1 as follows: “a haptic output device ~~mechanically coupled to~~ within the proxy object.” *Id.*, 258. The other independent claims were similarly amended. *Id.*, 259-60.

In an Advisory Action dated February 10, 2020, the Patent Office indicated that Applicant's amendments raise new issues that would require further search and/or consideration. *Id.*, 272. Accordingly, the amendments were not entered. *Id.*

In response, Applicant filed a response to the Final Office Action along with a Request for Continued Examination on February 24, 2020, further clarifying certain claims to address the pending rejections. *Id.*, 280-88. In particular, Applicant clarified claim 1 as follows:

1. A system comprising:
 - a proxy object comprising one or more haptic output devices;
 - ~~a haptic output device mechanically coupled to the proxy object;~~
 - a display configured to output a visual effect onto a surface of the proxy object;
 - a sensor for tracking a position of the proxy object; and
 - a processor configured to:
 - determine a modified visual effect based in part on data received from the
 - determine a haptic effect based in part on data received from the sensor;
 - transmit a display signal associated with the modified visual effect to the display, the modified visual effect to be displayed on the proxy object via the display;
 - transmit a haptic signal associated with the haptic effect to the one or more
 - haptic output device; and
 - output the haptic effect using the one or more haptic output devices.

Id., 280. The remaining independent claims were similarly clarified. *Id.*, 281-83.

Applicant further remarked in the response that “Gonzalez does not disclose ‘a proxy object **comprising one or more haptic output devices**’ with ‘**the modified visual effect to be displayed on the proxy object,**’ as is recited in amended claim

1.” *Id.*, 286 (emphasis in original). In response to Examiner’s assertion that Gonzalez “discloses ‘a proxy object,’ and ‘a haptic output device,’” Applicant explained that Gonzalez does not disclose a proxy object comprising one or more haptic output devices and a modified visual effect to be displayed on the proxy object as recited in the amended claims because the AR glove 196 in Gonzalez is the only device described as providing haptic feedback, but the virtual objects (which according to the Examiner, corresponds to a proxy object) and/or visible alterations to the vehicle (viewed through the AR headset) are not overlaid on the AR glove 196 since the purpose of the glove is to interact *with* the virtual objects as if they were real. *Id.*, 287. In other words, the AR glove (which is the only device that provides haptics) and what was alleged to be the proxy object are separate components in Gonzalez. Thus, Gonzalez did not disclose a proxy object comprising a haptic output device.

Applicant also explained that while Gonzalez taught an AR system that “can be used to provide other types of vehicle function[s] to a vehicle such as modifying the appearance of the vehicle when viewed through the AR headset[,]” the appearance modification is not displayed on an object with any feedback devices. *Id.*, 287. Applicant further explained that Rimon likewise did not teach overlaying virtual objects on an object comprising a haptic output device. *Id.*, 288. Applicant therefore concluded that the cited art could not render obvious claim 1 and requested withdrawal of the Section 103 rejection. *Id.*, 288. On March 4, 2020, the Patent

Office agreed with Applicant and issued a Notice of Allowance. *Id.*, 295. The '067 Patent subsequently issued on May 26, 2020. *Id.*, 323.

IV. PERSON OF ORDINARY SKILL IN THE ART (POSA)

Petitioner identifies a person of ordinary skill in the art ("POSA") as one who would have possessed a bachelor's degree in electrical engineering, computer science, or a related field, plus at least two years of industry or graduate level experience with human-computer interaction. Pet., 6 (citing Welch, ¶¶39). Petitioner also states that "[m]ore education could substitute for experience, and *vice versa*. *Id.*

Immersion submits that a POSA at the time of the '067 Patent would have had a bachelor's degree in electrical engineering or computer science (or an equivalent degree), and two years of practical or industry experience in the field of human computer interaction (HCI), including implementation of computer-based systems and software for providing haptic feedback effects to a user. EX2001, ¶33. Also, a person could have qualified as a POSA with more formal education and less practical or industry experience, or *vice versa*. *Id.* Immersion reserves the right to propose a different level of skill in the art if trial is instituted. In any event, the Petition fails to show that any Challenged Claim of the '067 Patent is unpatentable under either Petitioner's or Immersion's definition of a POSA.

V. CLAIM CONSTRUCTION

Although Petitioner provides a summary of its arguments directed to claim construction disputes between the parties in the co-pending district court litigation (see Pet., 7-9), Patent Owner submits that for purposes of this Preliminary Response, the Board need not resolve any of these disputes. None of the reasons discussed herein for why Grounds 1 to 3 do not have a reasonable likelihood of success depend on the construction of the terms disputed in the district court. The Petition fails to show that any Challenged Claim of the '067 Patent is unpatentable under either interpretation of the terms discussed in § VI of the Petition (*see* Pet., 7-9).

VI. PETITIONER HAS NOT MET ITS BURDEN TO SHOW THAT GROUNDS 1-3 HAVE A REASONABLE LIKELIHOOD OF SUCCESS

Petitioner raises three grounds of unpatentability. The asserted Grounds and Challenged Claims are as follows:

- (1) Claims 1-8, 11-12, 15-21 are anticipated by and/or obvious over Banerjee
- (2) Claims 1-8, 11-12, 15-21 are anticipated by and/or obvious over Meglan
- (3) Claims 1-8, 11-12, 15-21 are anticipated by and/or obvious over Rogers

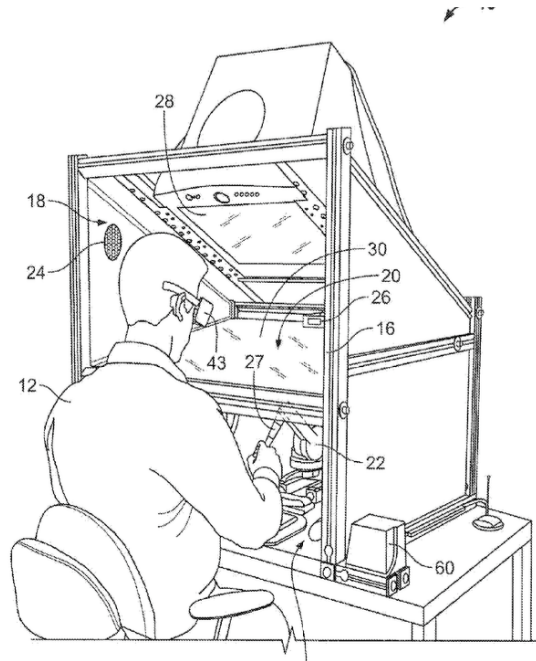
As detailed below, all three of these grounds fail to show a reasonable likelihood of success as to any of the Challenged Claims.

A. Ground 1: Petitioner Fails to Show that Challenged Claims 1-8, 11-12, and 15-21 are Anticipated by and/or Obvious Over Banerjee

Petitioner fails to show a reasonable likelihood of success for Ground 1 alleging that Banerjee anticipates and/or renders obvious the Challenged Claims of the '067 Patent. Specifically, the Petition has not shown that Banerjee discloses key limitations of the '067 Patent claims including (1) “a proxy object comprising one or more haptic output devices,” (2) “a sensor for tracking a position of the proxy object,” and (3) “the modified visual effect to be displayed on the proxy object.”

1. Overview of Banerjee (EX1011)

Banerjee is directed to a surgical workstation for simulation of cerebral aneurysm clipping using an augmented and virtual reality system with haptic feedback. EX1011, Abstract. Banerjee discloses a surgical workstation as shown below that simulates performing surgery. *Id.* This provides interactive and immersive training for surgical trainees, facilitating the practice of complex surgical procedures in a virtual environment rather than on actual patients. *See, e.g., id.*, ¶¶[0027]-[0029].



Id., Fig. 1.

Banerjee addresses the challenges of providing a realistic, interactive training environment for simulating neurosurgical procedures such as cerebral aneurysm clipping. *Id.*, ¶[0003]. By utilizing haptic feedback, augmented and virtual reality technologies, the system provides hands-on training without the risks associated with surgery on live patients. *Id.*, ¶¶[0027]-[0030]. This includes simulating the tactile feedback of surgical instruments and the visual and physical interaction with neurological tissue and organs. *Id.*, ¶¶[0033]-[0035].

2. Petitioner Fails to Show that Banerjee Discloses “a proxy object comprising one or more haptic output devices” as required by the claims of the '067 Patent

Petitioner has not shown that Banerjee discloses a proxy object **comprising** a haptic output device in accordance with the claims of the '067 Patent. Claim 1 recites a **proxy object** with three express requirements that must be met:

- (a) the proxy object must comprise one or more haptic output devices—i.e., the proxy object **must include** a haptic output device as part of the overall structure of the proxy object (EX1001, cl. [1A]);
- (b) the proxy object's position is tracked by a sensor such that haptic feedback is based on this position sensor data (*Id.*, cl. [1C]); and
- (c) the proxy object must have a modified visual object display onto its surface (*Id.*, cl. [1D-3]).

Petitioner alleges that the proxy object comprising a haptic output device is satisfied by Banerjee's “haptic device 22” (Pet., 14-16) *or alternatively*, “stylus 27” (Pet., 17), as shown by Petitioner's annotated Fig. 1 (Pet. 15):

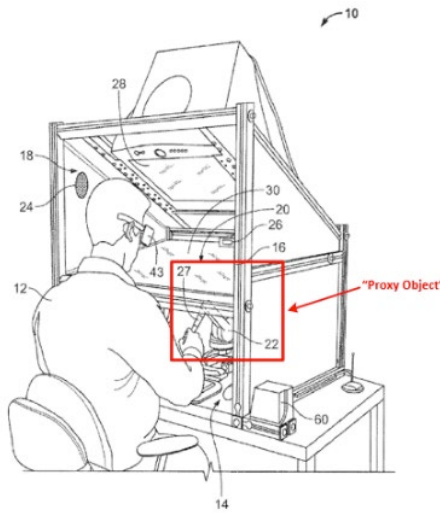


FIG. 1

As detailed below, neither qualify as the claimed proxy object.

a) Haptic Device 22 is not a proxy object

Petitioner's first mapping of the claimed proxy object to haptic device 22 is based on three alleged reasons: (1) haptic device 22 comprises a haptic output device because it is a haptic device that outputs force feedback; (2) haptic device 22 comprises haptic stylus 27, which is a haptic output device because the user feels the haptic sensations through the stylus; and (3) haptic device 22 comprises a haptic output device because it includes actuators to produce the force feedback output. Pet., 16.

Each of these reasons fail to meet all the requirements of the proxy object as set forth in the claims. *First*, regardless of whether it includes a haptic output device that provides force feedback, haptic device 22 cannot be the claimed proxy object because its position is not tracked, nor would it be since haptic device 22 is a

stationary object anchored to the open surgery station in Banerjee. EX1011, ¶¶[0032]-[0035]; EX2001, ¶¶60-61. This is shown below in an illustration of the surgery station. Petitioner also confirms this, explaining that “position and orientation *of the user's hand* as it moves the stylus” is tracked—not position of haptic device 22. Pet., 14 (emphasis added). Indeed, the user's hand does not move haptic device 22. It only moves the stylus, which as explained further below, is not a proxy object.

Second, Petitioner's argument that haptic device 22 comprises haptic stylus 27 is just as unavailing. As shown in the figure below, haptic device 22 and stylus 27 are two distinct and physically separate components that are, at best, mechanically coupled to each other. Petitioner cannot conflate the two because one does not comprise the other. EX2001, ¶¶62-69. In fact, this is also shown by the fact that Petitioner identifies haptic device 22 alone (Pet., 14-16), *or in the alternative*, stylus 27 alone (Pet., 17) as two separate components that can each allegedly satisfy the claimed proxy object. Moreover, as detailed above in § III.C, Applicant of the '067 Patent disclaimed this same type of arrangement in which separate proxy object and haptic output device components interact with each other or are “mechanically coupled”—expressly towards the “comprising” relationship allowed by the Patent Examiner. *See supra* § III.C; EX1002, 287; *see also* EX2001, ¶¶ 62-65. Thus, such mechanically coupled arrangement in Banerjee does not satisfy this claim limitation.

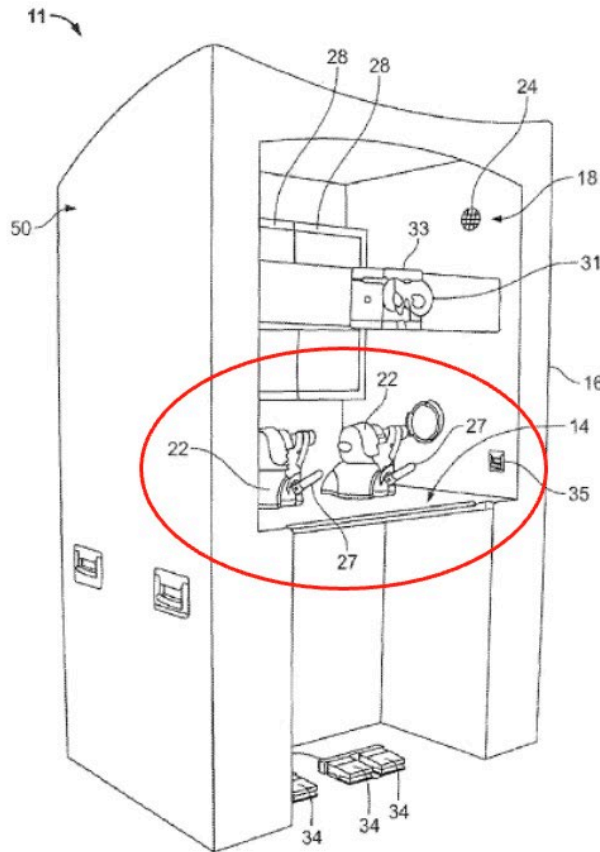


FIG. 4

EX1011, Fig. 4 (red circle added).

Third, Petitioner argues that haptic device 22 comprises haptic stylus 27 because the user feels “tactile sensations” through the stylus, and thus the stylus is allegedly the haptic output device. *See* Pet., 16. The stylus, however, is not a haptic output device because it does not contain any actuators or motors, which Petitioner acknowledges is what constitutes a haptic output device. *Id.* (Petition citing to EX1001, 2:53-55, 4:23-33 to support that actuators and motors are haptic output devices). EX2001, ¶66. While haptic device 22 cannot be the claimed proxy object

for the various reasons described in this section, it does purportedly include actuators or motors, as Petitioner acknowledges. Pet., 16. Therefore, according to Petitioner's own admission, the haptic output device is haptic device 22, not the stylus.

Fourth, haptic device 22 cannot be the proxy object because the claimed “modified visual effect” is not displayed on the haptic device 22 as required by the claims. Instead, according to the Petition, the alleged modified visual effect is displayed on the surface of the stylus, which as explained above, is separate from haptic device 22. For example, Petitioner states: “Banerjee's OSS 10 meets [1D3] because its display system “superimpose[s] an image of the tool over the real haptic stylus 27 visible through partially transparent mirror.” Pet., 33 (citing EX1010, ¶[0057]).

This is consistent with the fact that the stylus is moveable, and hence, its position is tracked unlike haptic device 22, which is anchored to the surgery station as explained above. EX2001, ¶67-68. That is also why the modified visual effect is displayed on the stylus—not haptic device 22—in order to produce a 3D image of a virtual tool, which Petitioner explains: “As shown [...] in FIG. 2, below, ‘graphics rendering 46’ receives *the virtual tool's* current position and orientation updated by ‘haptic rendering 44’ to coincide with *stylus 27's current position and orientation.*” Pet., 27 (emphasis added). EX2001, ¶67-68. Petitioner also argues that this position “tracking allows a virtual tool to be ‘collocated with [] haptic device 22’ in views

shown to the user.” *Id.*, 14-15 (citing EX1010, ¶¶[0032]-[0034]). This alleged “collocation” occurs only because the modified visual effect is superimposed on the stylus 27 and not on haptic device 22 itself, as explained above. EX2001, ¶69. Accordingly, Petitioner fails to show that Banerjee’s haptic device 22 is the claimed proxy object.

b) Stylus 27 is not a proxy object

Petitioner’s second mapping of the claimed proxy object to stylus 27 alleges that the stylus is a proxy object for controlling a virtual tool and that it comprises a haptic output device because “it is itself a ‘*haptic output device*’ through which ‘tactile sensations’ are felt.” Pet., 17. Petitioner argues that “POSAs understood that haptic stylus 27 comprises the actuators.” *Id.* This is contrary to Petitioner’s own statement that “Banerjee’s haptic device 22 that generates ‘force feedback’ includes actuators (e.g., motors) to produce the disclosed ‘force feedback.’” The stylus is not a haptic output device, nor does Banerjee disclose that the stylus has any haptics producing hardware such as actuators or motors. A POSA would understand that the stylus itself is not a “haptic output device.” EX2001, ¶70. Rather it is a passive device through which a user feels force feedback resistance generated from haptic device 22 to which the stylus is mechanically coupled. *Id.* Because the claim expressly requires a proxy object to *comprise* the haptic producing hardware, having the haptic hardware simply coupled mechanically to the proxy object does not satisfy

the claims. In fact, the Applicant of the 067 patent had disclaimed such a mechanically coupled arrangement to overcome the Gonzalez prior art during prosecution. *See supra* § III.C; EX1002, 287; EX2001, ¶70. Accordingly, Petitioner fails to show that Banerjee's stylus 27 is the claimed proxy object.

3. Petitioner Fails to Show that Banerjee Discloses “a sensor for tracking a position of the proxy object” as required by the claims of the '067 Patent

Petitioner contends that “Banerjee's system meets claim element [1C] because haptic device 22 tracks the position of haptic stylus 27.” Pet., 22. Petitioner alleges three reasons for why Banerjee tracks the position of the stylus: (1) “the tracked position/orientation of haptic stylus 27 is a ‘*position*’ of haptic device 22 (a claimed ‘*proxy object*’ [...]) of which the stylus is a part,” (2) because the haptic stylus itself is allegedly a proxy object, the haptic device 22 tracks a position of the of the proxy object by tracking the position of the stylus, and (3) haptic device 22 purportedly includes sensors that track a position of haptic device 22 thereby also tracking a position of the stylus.

If Petitioner contends that the tracked position of the stylus 27 is merely “a position” of the separate haptic device 22 (e.g., the first and third alleged reasons listed above), Petitioner fails to demonstrate that Banerjee discloses a “sensor for tracking a position of the *proxy object*.” This is because Banerjee does not disclose tracking the position of haptic device 22, nor would there be a need to since that

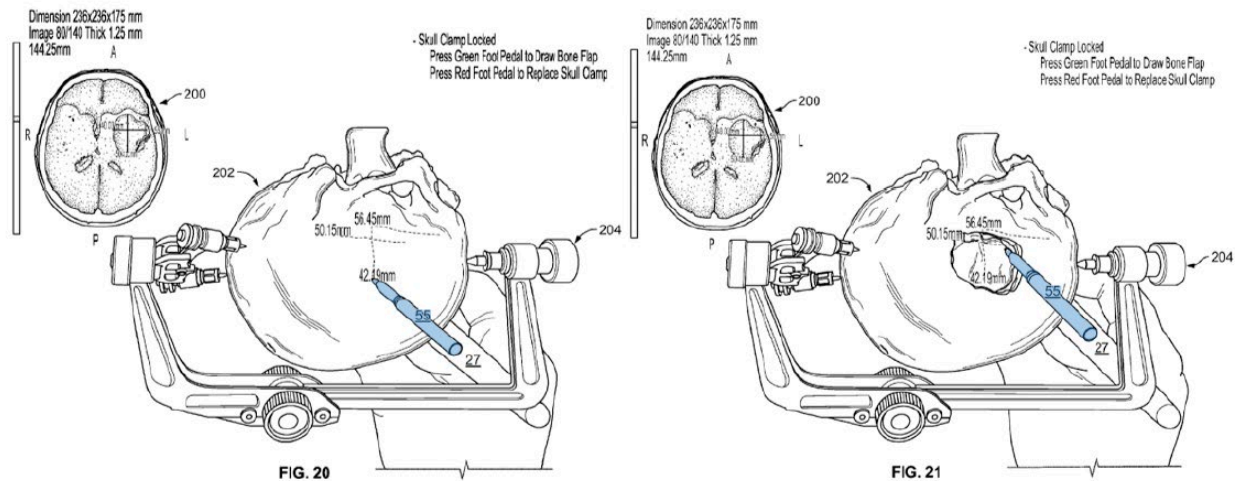
haptic device is anchored to the surgery station. EX2001, ¶72. Also, to the extent Petitioner contends that the stylus is itself a proxy object and that its position is tracked (e.g., the second alleged reason listed above), Petitioner fails to demonstrate that Banerjee disclose this limitation because as explained above, Petitioner has failed to prove that the stylus is the claimed proxy object. *See supra* § VI.A.2.b; EX2001, ¶73.

4. Petitioner Fails to Show that Banerjee Discloses “the modified visual effect to be displayed on the proxy object via the display” as required by the claims of the '067 Patent

Petitioner only relies on stylus 27 for this limitation, alleging that the modified visual effect is displayed on the surface of the stylus, which it contends can be the proxy object. Pet., 32-34. For the reasons explained above, however, Petitioner fails to show that Banerjee's stylus 27 is a proxy object comprising a haptic output device. *See supra* § VI.A.2.b; EX2001, ¶¶74-75. Accordingly, to the extent Petitioner relies on stylus 27 for this limitation, Petitioner fails to show that the limitation is satisfied by Banerjee because stylus 27 does not meet the requirements of the claimed proxy object. *Id.*

Note that Petitioner does not rely on haptic device 22 for this limitation, nor can it because Banerjee does not disclose superimposing any images on to the surface of haptic device 22. This is also shown in the Petition's discussion of the

claimed modified visual effect where it reproduces Banerjee’s figures 20-21, which only depict stylus 27 highlighted in blue, but not haptic device 22:



Pet., 29 (reproducing EX1010, FIGs. 20-21 with blue highlights added).

5. Petitioner Fails to Show that Dependent Claims 2-8, 12, 15-20 are Anticipated by and/or Obvious over Banerjee

Claims 2-8 depend from independent Claim 1. Claims 12 and 15-20 depend from independent Claim 11. As described above in §§ VI.A.2-4, the Petition fails to show that Banerjee anticipates or renders obvious independent Claims 1, 11, and 21. For example, Petitioner has not shown that Banerjee discloses the claimed limitations, “a proxy object comprising one or more haptic output devices” or “the modified visual effect to be displayed on [the proxy object / a surface of the proxy object] via the display,” as recited in Claims 1, 11, and 21. Petitioner has also failed to show that Banerjee discloses “a sensor for tracking a position of the proxy object.”

Therefore, Petitioner fails to show a reasonable likelihood of success in establishing that Banerjee anticipates and/or renders obvious dependent claims 2-8, 12, and 15-20 for the same reasons as those articulated above in §§VI.A.2-4 above.

B. Ground 2: Petitioner Fails to Show that Challenged Claims 1-8, 11-12, and 15-21 are Anticipated by and/or Obvious Over Meglan

Petitioner fails to show a reasonable likelihood of success for Ground 2 alleging that Meglan anticipates and/or renders obvious the Challenged Claims of the '067 Patent. Specifically, the Petition has not shown that Meglan discloses “determin[ing] a haptic effect based in part on data received from the sensor,” where such data is position tracking data of the proxy object as claimed in the '067 Patent.

1. Overview of Meglan (EX1012)

Meglan is directed to devices and methods for training individuals to treat individuals with hemorrhaging injuries. EX1012, ¶[0003]. Meglan discloses a hemorrhage control simulator, as shown below, that measures the application of hemostatic agents and enables the extraction of objective measures of performance to assess the proficiency of trainees. *See, e.g., id.*, ¶¶[0011], [0100]. The simulator also supports real-time mentoring without the need for the presence of an instructor, making it a comprehensive tool for training in the treatment of bleeding injuries. *Id.*, ¶[0098].

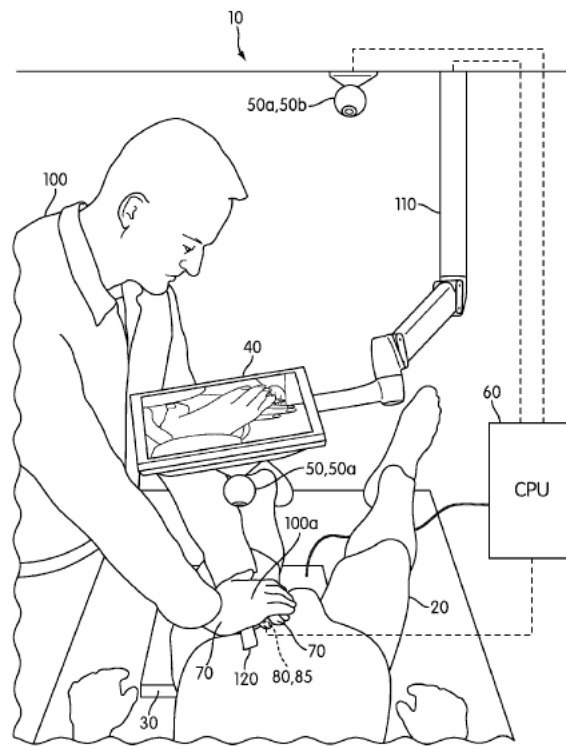


FIG. 1

EX1012, Fig. 1.

Thus, Meglan addresses the challenge of providing realistic, effective, and uniform hemorrhage control training without the need for an actual wound or the presence of an instructor. This approach overcomes limitations of traditional training methods, such as the lack of realism in simulated wounds, the difficulty of assessing performance uniformly, and the logistical challenges of coordinating training sessions with the physical presence of instructors and standardized training and assessment. *Id.*, ¶¶[0017]-[0022].

2. Petitioner Fails to Show that Meglan Discloses “determine a haptic effect based in part on data received from the sensor” that tracks a position of the proxy object as required by the claims of the '067 Patent

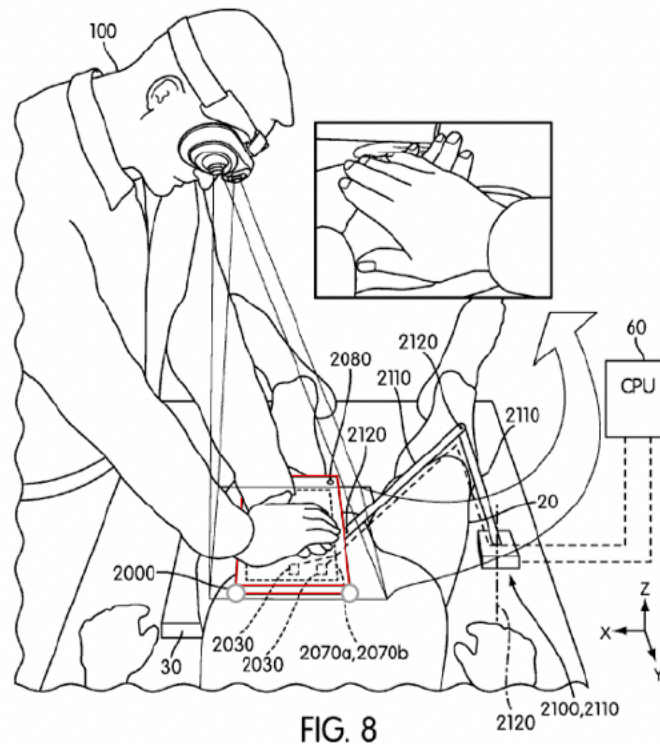
As detailed below, Petitioner has not shown that Meglan discloses the limitation “determine a haptic effect based in part on data received from the sensor” as required by the claims of the '067 Patent. Claim 1 of the '067 Patent recites a system that comprises in relevant part a “*a sensor* for tracking a position of the proxy object” (claim element [1C]) and a processor that is configured to, *inter alia*, “determine a haptic effect based in part on data received from *the sensor*” (claim element [1D-2]). EX1001, cl. 1 (emphasis added). The '067 Patent explains that the data received from *the sensor* and which the haptic effect is based on is data reflecting the position of the proxy object tracked by the sensor:

Systems and methods for integrating haptics overlay in augmented reality are disclosed. One illustrative system described herein includes a haptic output device. The system also includes a display configured to output a visual effect. **The system also includes a sensor for tracking a position of a proxy object. The system also includes a processor configured to:** determine a modified visual effect based in part on data received from the sensor, **determine a haptic effect based in part on data received from the sensor**, transmit a display signal associated with the modified visual effect to the display, transmit a haptic signal associated with the haptic effect to the haptic output device; and output the haptic effect using the haptic output device.

EX1001, Abstract (emphasis added); *see also id.*, 1:29-40.

Petitioner fails to show that Meglan discloses “determin[ing] a haptic effect based in part on data received from the sensor,” where the data reflects *the proxy object’s position that is tracked by the sensor* as required by claim elements [1C] and [1D-2]. As detailed below, Petitioner does not show that Meglan’s haptic effects are based on data reflecting the alleged proxy object’s position. EX2001, ¶81. Instead, according to the Petition, the haptic effects in Meglan are based on the location of the trainee’s hands and fingers—not the alleged proxy object (i.e., what Petitioner points to as surrogate 20 and/or substrate 2000).

Petitioner alleges that “surrogate 20 and haptic substrate 2000, by themselves or together as a unit” satisfy the claimed proxy object. In reference to Figure 8 shown below, Petitioner alleges that, “‘sensorized substrate 2000’ (boxed in red) provides haptic output via pulse and heat generators so that trainee 100 can feel characteristics of the virtual wound being treated.” Pet., 49.



EX1012, FIG. 8 (red box added by Petitioner). Petitioner states that the “sheet-like” substrate 2000 acts as a proxy for the skin of the surrogate body 20 that the trainee is treating “and for the virtual wound for which substrate 2000 provides haptic feedback.” Pet., 50.

In attempts to satisfy claim element [1D-2], Petitioner offers two alleged examples in Meglan, neither of which provide haptic feedback based on data that reflects the position of the proxy object tracked by the sensor. In the first example, Petitioner alleges that Meglan discloses claim element [1D-2] because haptic effects provided by a pulse generator are *based on the trainee’s finger location* that is detected by the camera sensor. Pet., 57-58. Petitioner also provides a second example

in which haptics effects provided by a heat generator are allegedly based on the location of the trainee's ***hands*** as detected by the camera. *Id.*, 58.

Both of these examples fail to show any haptic effect that is based on sensed position data *of the proxy object* as required by the '067 Patent. EX2001, ¶84. *First*, neither of the trainee's fingers or hands qualify as the claimed proxy object, nor does Petitioner allege that these body parts satisfy the proxy object limitation (claim element [1A]). *Id.*, ¶¶84-85. Indeed, the trainee's hands or fingers in Meglan do not include a haptic output device, and thus cannot satisfy the claimed limitation, "a proxy object comprising one or more haptic output devices." *Id.* Instead, as Petitioner contends, the claimed haptic output device in Meglan is its "pulse generators" and "heat generators" in substrate 2000—which is part of what Petitioner alleges is the proxy object—as shown in above in Figure 8. Pet., 50-51 (citing, e.g., EX1012, ¶[0107]). Therefore, Meglan's determination of haptic effects based on the location of the trainee's fingers or hands, as shown by Petitioner, does not meet claim limitation [1D-2]. The fingers and hands are the only objects Petitioner identifies for meeting this limitation.

Second, even if the trainee's hands or fingers were to qualify as the claimed proxy object (which they do not for the reasons detailed above), the alleged haptic effects are not based on the trainee's hands or finger *location* as detected by the camera (Note that Petitioner does not identify the hands or fingers as the proxy

object, rather it identifies the surrogate and substrate as the proxy object). EX2001, ¶¶86-88. For example, Petitioner alleges that Megan discloses claim element [1D-2] because haptic effects provided by a pulse generator are *based on the trainee's finger location* that is detected by the camera sensor:

The “specific feel of the pulse” provided by the “calculated simulated pulse” is a “*haptic* effect” that program 90 determines by combining load sensor data based on “the finger location(s) *detected by the camera system 50*” (i.e., “*based on data from the sensor*”) and the state of the simulation, thus meeting [1D2].

Pet., 57-58. In support of this argument, Petitioner relies on ¶[0090] of Megan, which describes how the use of the finger location can be combined with the information from the load sensor beneath the surrogate 20 (i.e., the pressure sensor in the substrate 2000) to modify the pulse generator output:

By combining the information from the *load sensor 30* beneath the surrogate 20 with the finger location(s) detected by the camera system 50, the status of the injury, and the hemodynamic state, the *specific feel of the pulse* can be modified *to reflect the strength of the trainee's pressing into the surrogate 20*.

EX1012, ¶[0090]. In other words, the strength of the pulse generator output is based in part on a *load sensor* which measures *how hard* the trainee is pressing on the surrogate body—*not* the position. EX2001, ¶¶86-89. Providing haptics as a function

of physically applied load or pressure has nothing to do with the location of the alleged proxy object—i.e., the surrogate or substrate. In any event, Petitioner does not allege that the load sensors are the claimed sensor. Pet., 53-54. Furthermore, a POSA would understand that the finger location (though the finger cannot be the claimed proxy object) is only used in the modification of the injury status and the hemodynamic state as explained above in Meglan. *See* EX2001, ¶¶88-89; EX1012, ¶¶0090]. The location of the finger is not used for haptics, rather, only the pressure measurement from the load sensor is used for such haptics as explained above. *Id.*, ¶¶87-89. Therefore, Meglan's alleged haptics produced by the pulse generator is not based on the data received from the sensor tracking a *position of the proxy object* as required by the claims of the '067 Patent.

Accordingly, the Petition fails to show that Meglan discloses the determination of haptic effects based on data received from the sensor, where such sensor is for tracking the position of the proxy object. Thus Petitioner fails to show a reasonable likelihood of success in establishing that Meglan anticipates and/or renders obvious the Challenged Claims.

3. Petitioner Fails to Show that Dependent Claims 2-8, 12, 15-20 are Anticipated by and/or Obvious over Meglan

Claims 2-8 depend from independent Claim 1. Claims 12 and 15-20 depend from independent Claim 11. As described above in §§ VI.B.2, the Petition fails to

show that Meglan anticipates or renders obvious the challenged independent claims. For example, Petitioner has not shown that Meglan discloses the claimed limitation, “determine a haptic effect based in part on data received from the sensor” as recited in the independent claims of the '067 Patent. Therefore, Petitioner fails to show a reasonable likelihood of success in establishing that Meglan anticipates and/or renders obvious dependent claims 2-8, 12, and 15-20 for the same reasons as those articulated above in §§VI.B.2 above.

C. Ground 3: Petitioner Fails to Show that Challenged Claims 1-8, 11-12, and 15-21 are Anticipated by and/or Obvious Over Rogers

Petitioner fails to show a reasonable likelihood of success for Ground 3 alleging that Rogers anticipates and/or renders obvious the Challenged Claims of the '067 Patent. Specifically, the Petition has not shown that Rogers discloses key limitations of the '067 Patent claims including (1) “a sensor for tracking a position of the proxy object,” (2) “determine a haptic effect based in part on data received from the sensor,” and (3) “determine a modified visual effect based in part on data received from a sensor.”

1. Overview of Rogers (EX1010)

Rogers is directed to the use of a directional interface object designed for various computing environments such as video games and interactive applications. EX012, ¶[0039]. Rogers discloses embodiments for providing input through this

directional interface object in such interactive video games with hand-held user devices as shown below. *Id.*

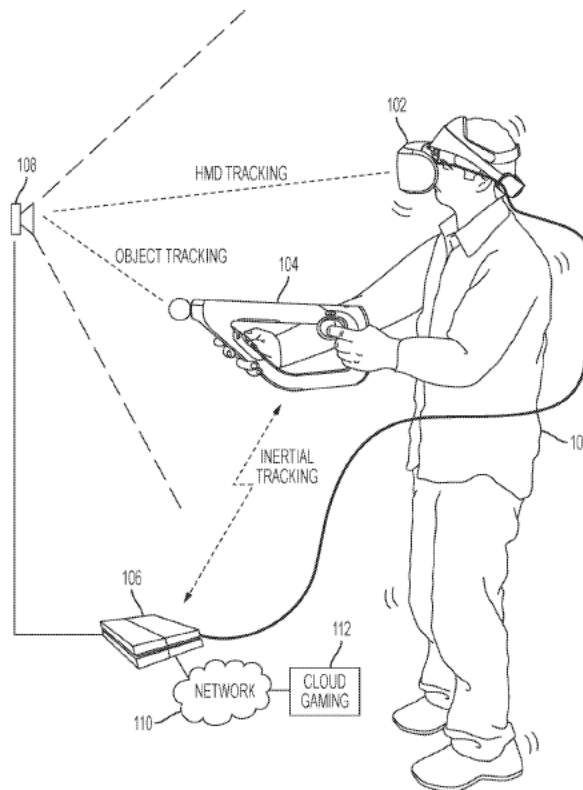


FIG. 1

EX1012, Fig. 1.

Rogers aims to address issues related to user interactions in virtual reality (VR) environments as experienced through head-mounted displays (HMDs). *Id.*, ¶[0007]. Rogers discloses methods and systems for improving the way users interact with VR content, through specialized interface objects or devices that include features such as for detecting which hands are grasping different portions of the interface object. *Id.*

2. Petitioner Fails to Show that Rogers Discloses “a sensor for tracking a position of the proxy object” that is used to “determine a haptic effect based in part on data received from the sensor” as required by Claim 1

Petitioner fails to show a reasonable likelihood of success for Ground 3 alleging that Rogers anticipates and/or renders obvious the Challenged Claims of the '067 Patent. As detailed below, Petitioner has not shown that Rogers discloses “a sensor for tracking a position of the proxy object” that is used to determine a *haptic effect* based on the position tracking data from that sensor as required by claim elements [1C] and [1D-2]. For limitation [1C], Petition identifies two of Rogers' components: (1) “camera 108” *or* (2) the inertial sensor. Pet., 72-73. Petitioner alleges that either of these components alone meet the claimed “sensor for tracking a position of the proxy object.” *Id.*

a) Rogers' Camera 108 is not a position sensor used in determining haptics to mimic reloading a weapon

Petitioner contends that Rogers' “camera 108” for “determin[ing] the location and movements of the...interface object 104” satisfies limitation [1C]. Pet., 72 (citing EX1010, ¶[0044]). This embodiment describing camera 108 in Rogers, however, is different from the one that Petitioner identifies to satisfy the haptics claim element—which is directed to a use case that does not involve *location* of the proxy object (which Petitioner alleges is the “virtual weapon” (Pet., 69-70)). The embodiment to which Petitioner maps the haptics claim element provides haptic

effects *based on direction / orientation* of the interface object—not position. For example, Petitioner argues that Rogers produces a desired haptic effect:

when a user reloads their corresponding virtual weapon by, for example, *pointing the directional interface object 104 upward*, the moveable weight 800 may be caused to move so as to mimic the sensation of the weapon reloading mechanism of the virtual weapon.

Pet., 77 (citing EX1010, ¶[0105]).

Petitioner cannot piece together different aspects of different embodiments in this way. Petitioner should not be permitted to point to another embodiment that discloses the use of camera 108 for tracking the location of the interface object and combine it with the weapon reload embodiment that otherwise has no need for location data since all it determines is direction/orientation. Petitioner has not shown that the features of the different embodiments in Rogers can be interchanged or combined. *See, e.g., Abiomed, Inc. v. Maquet Cardiovascular, LLC*, IPR2017-01204, Paper 8 at 11, (PTAB Oct. 23, 2017) (denying institution of IPR because petitioner failed to show that features of disparate embodiments in prior art reference were interchangeable or combinable)

And as further detailed below in § VI.C.2.b, direction or orientation for the weapon reload embodiment is determined by Rogers' inertial sensor—not camera 108. Indeed, there is no disclosure whatsoever in Rogers that camera 108's position

tracking data is used to produce haptic effects in mimicking the sensation of a weapon reload. EX2001, ¶94. Moreover, a POSA would understand that there is no need for position sensing data from a camera when determining whether the weapon is tilting upward. EX2001, ¶¶95-96. In other words, Petitioner cannot satisfy the sensor claim limitation by pointing to Rogers' camera 108, because the camera is not used for the specific weapon reload embodiment that the Petition relies on for the haptics claim element. *Id.*

Ignoring the fact that the weapon reload embodiment does not depend on position tracking data from camera 108 to determine haptics, Petitioner reaches for a different embodiment in which Rogers states that camera 108 can capture images to be used for determining the location and movements of the user, the HMD, and the interface object (Pet., 72-73 (citing EX1010, ¶[0044])).

Furthermore, as detailed below in § VI.C.2.b, this embodiment described in ¶[0044] of Rogers employs the combinational use of camera 108 *and* inertial sensors to determine location *and* orientation, respectively, where the camera alone determines location and the inertial sensor alone tracks orientation. This is also shown by Petitioner's citation to Figure 1 shown below, which depicts an "Inertial Tracking" line reflecting movement or orientation data (highlighted in red) and a separate "Object Tracking" line reflecting position tracking data (highlighted in green). Pet., 73. Petitioner confirms as much by stating that "Object Tracking" *and*

“Inertial Tracking” in Figure 1 are used to determine location *and* orientation, respectively. Pet., 74. Petitioner also cites to claim 9 of Rogers, which confirms that inertial sensor alone is only for sensing *movement* of the interface object—not position of the object. *Id*; see also EX1010, cl. 9. And to the extent that “Object Tracking” line (i.e., which is based on data from camera 108) is also generally used in the weapon reload embodiment, a POSA would understand that the camera sensor would only be used for the purpose of displaying visual overlay and minimizing latency in the video display—*not for haptics*. *Id.*, ¶96.

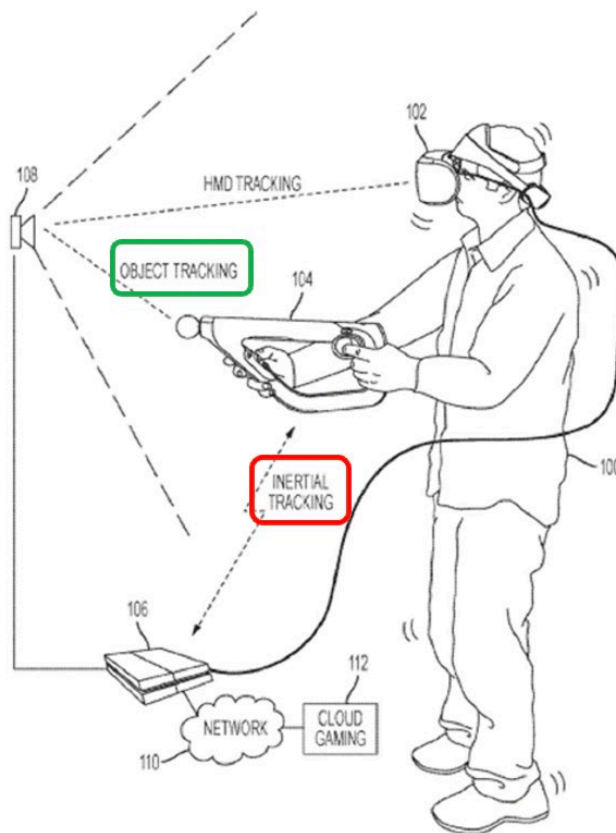


FIG. 1

Further, reliance on the embodiment of Figure 1 and ¶[0044] is inconsistent with the rest of Petitioner's mapping for Claim 1. For limitation [1D-2], Petitioner identifies the weapon reloading embodiment, which clearly describes determining haptic effects based on tilting the weapon upward, i.e., the weapon's direction—regardless of location or position. Pet., 77 (citing EX1010, ¶[0105]).

Indeed, Rogers does not disclose the use of camera 108 to determine haptic feedback for a weapon reload based on its location, nor would a POSA see a need for a position sensing camera in such embodiment that otherwise depends on the direction of the weapon, i.e., the alleged proxy object. EX1010, ¶[0105], EX2001, ¶¶94-96. A POSA would understand that this embodiment does not depend on the position of the alleged proxy object because reloading can occur anywhere, and thus haptic feedback only depends on movement in an upward orientation, e.g., *orientation and not position*. EX2001, ¶96. Thus, a POSA would understand that this use case only requires “Inertial Tracking” depicted in Figure 1 (which is further detailed below in the inertial sensors discussion), which only needs to track direction—not position. *Id.* To the extent that the “Object Tracking” line in Figure 1 (i.e., which is based on data from camera 108) is also used in the weapon reload embodiment, a POSA would understand that the camera sensor would only be used for the purpose of displaying visual overlay and minimizing latency in the video display—not for haptics. *Id.* at ¶96.

Accordingly, Rogers fails to disclose “a sensor for tracking a position of the proxy object” that is used to determine a haptic effect based on the position tracking data from that sensor as required by claim elements [1C] and [1D-2].

b) Rogers' Inertial Sensor is not a position sensor for determining haptics

Petitioner also contends that Rogers' “inertial sensor” for determining “interface object 104's ‘location and orientation’” satisfies limitation [1C] as well. *Id.*, 73 (citing EX1010, ¶[0044]). Rogers, however, repeatedly explains that the “inertial sensors” track movement—not position. A POSA would understand that movement is different from position. EX2001, ¶98-99. For example, tracking position of an object in three dimensions involves tracking the X, Y, and Z coordinates of an object. On the other hand, sensing movement simply involves determining whether an object has moved in either translation or rotation (e.g., true or false), or may involve sensing the magnitude of translational or rotational movement. *Id.*, ¶98. In Rogers, the inertial sensors track movement. *See, e.g.*, EX1010, ¶[0016] (“In some implementations, the directional interface object further includes at least one inertial sensor for ***sensing movement*** of the directional interface object.”), ¶[0018]. This is also confirmed by Petitioner's citation to claim 9 of Rogers, which recites an “inertial sensor for ***sensing movement*** of the directional interface object.” Pet., 73; EX2001, ¶99. Further, another one of Petitioner's

citations to Rogers discusses “various kinds of motion sensitive hardware, such as a magnetometer 1210, an accelerometer 1212, and a gyroscope 1214.” Pet., 73; EX1010, ¶[0111]; EX2001, ¶99. Petitioner cannot dispute that inertial sensing is for tracking movement as understood by a POSA. EX2001, ¶99.

Petitioner also cites to another embodiment in Rogers directed to “Inertial Tracking” illustrated in Figure 1 as shown below. Pet., 73.

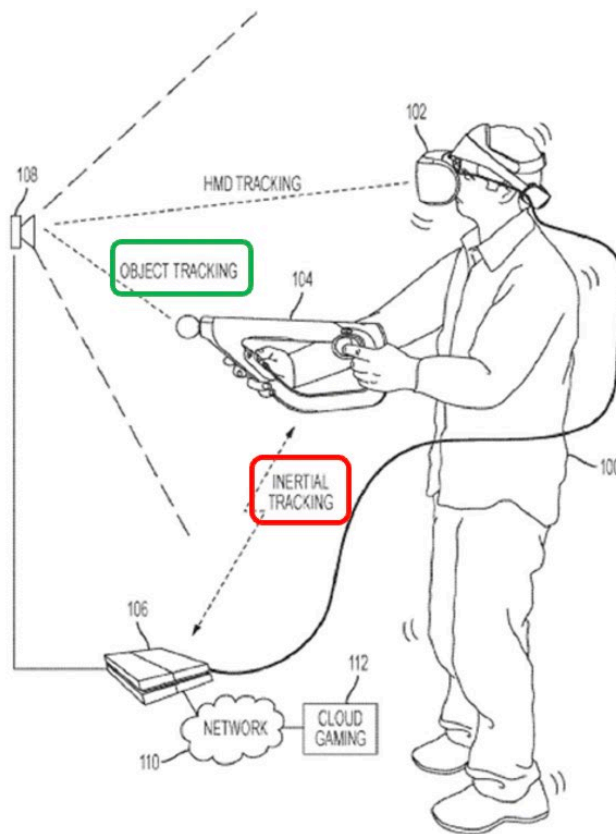


FIG. 1

EX1010, Fig. 1 (red and green boxes added). With respect to Figure 1, Petitioner cites to several passages in Rogers that allegedly explains how inertial sensors are used for Inertial Tracking:

Rogers's interface object 104 also "includes an inertial sensor" by which "inertial tracking [is] communicated with computer 106" ([0052]) to determine interface object 104's "location and orientation" ([0044]). *See also* [0111], FIG.1 ("Inertial Tracking"), claim 9.

Pet., 73 (citing [0052], [0044], [0111], and claim 9). Yet, the full disclosure actually states the following:

a camera 108 can be configured to capture images of the interactive environment in which the user 100 is located. These captured images can be analyzed to determine the location and movements of the user 100, the HMD 102, and the directional interface object 104. In various implementations, the directional interface object 104 includes *a light which can be tracked, and/or inertial sensor(s), to determine its location and orientation.*

]Pet., 73 (citing EX1010, ¶[0044]) (emphasis added). This disclosure only generically discloses how the *camera* uses captured images to determine location—e.g., by tracking a light. This camera disclosure, however, does not teach that inertial sensors *alone* track the position of the weapon. This is merely a description of how the combination of a camera and an inertial sensor are used to track location and

orientation, respectively. In other words, the camera is responsible for tracking location and the inertial sensor is responsible for tracking orientation. As illustrated in Figure 1 and discussed above, camera 108 captures images to determine the location of the interface object, which is depicted by the “Object Tracking” line highlighted in green. EX1001, Fig. 1, ¶[0044].

According to Rogers, the camera can track a light on the interface object along with the use of an inertial sensor to determine the object's location and orientation. *Id.* The camera images are used together with the inertial sensor to determine the location—depicted by the “Object Tracking” line—and orientation of the interface object—depicted by the “Inertial Tracking” line highlighted in red. *Id.* In this embodiment, while the camera tracks location, the inertial sensors alone only track movement or orientation—not location. EX1010, ¶¶[0016], [0018], [0111]. Petitioner also confirms this by stating that “Object Tracking” and “Inertial Tracking” in Figure 1 are used to determine “location and orientation,” respectively—where the “Inertial Tracking” line in Figure 1 only consists of *movement* data. Pet., 74. Moreover, neither the Petition nor Rogers ties this generic camera disclosure to any haptic effects—as required by the claims. And even if “Object Tracking” line in Figure 1 is also used in the weapon reload embodiment (which there is no evidence of), a POSA would understand that the camera sensor

would only be used for the purpose of displaying visual overlay and minimizing latency in the video display. *Id.* at ¶96.

Therefore, inertial sensors alone do not satisfy the limitation [1C] “a sensor for tracking a position of the proxy object” since inertial sensors only track movement rather than position.

3. Petitioner Fails to Show that Rogers Discloses “determine a haptic effect based in part on data received from the sensor” as required by the claims of the '067 Patent

The Petitioner has not shown that Rogers discloses haptic effects based on sensor data reflecting the position of the proxy object. As explained in greater detail above in §VI.C.2.a, the weapon reload use case that Petitioner identifies does not use sensor data tracking the position of the alleged proxy object, nor would it need to because that use case depends on tilting the weapon in an upward ***orientation*** rather than ***location*** of the weapon. *See supra* §VI.C.2.a ; EX2001, ¶100. At best, as explained above, the use case identified by Petitioner only discloses haptic effects based on the inertial sensor's dermination of ***direction***—not ***position*** determined by the camera. *Id.* The Petition does not provide any support showing that both camera 108 (for tracking position) and the inertial sensor are employed in specifically determining haptics for this weapon reload use case. In other words, Petitioner has not proven that data is used from both the “Object Tracking” line and the “Inertial

Tracking” line depicted in Figure 1 for determining haptics in mimicking a weapon reload. EX2001, ¶100.

Accordingly, the Petition fails to show that Rogers discloses the determination of haptic effects based on data received from the sensor, and thus, fails to show a reasonable likelihood of success in establishing that Rogers anticipates and/or renders obvious the claims of the '067 Patent.

4. Petitioner Fails to Show that Rogers Discloses “determine a modified visual effect based in part on data received from the sensor” as required by the claims of the '067 Patent

The Challenged Claims require that *both* determinations for haptic effect *and* modified visual effect are based at least in part on the same sensor data. *See* Ex. 1001 at Claim 1, elements [1D1] and [1D2]. Both claim elements [1D1] and [1D2] recite determining a modified visual effect *and* haptic effects based on *the* position sensor—the antecedent basis of which is in claim element [1C], “a sensor for tracking the position sensor of the proxy object.” Both limitations for determining a modified visual effect and haptic effects must be based on the same sensor for tracking the position of the proxy object. EX2001, ¶101.

The Petitioner has not shown that Rogers discloses determining a modified visual effect based on sensor data that is also used to determine haptic effect as claimed by the '067 Patent. Petitioner has failed to show that *both* determinations are based on the same sensor data. Instead, Petitioner has only shown that modified

visual effects are based on position sensor data while haptic effects are based on inertial sensor data. Notwithstanding Petitioner's argument that both "camera 108's images and inertial sensor data" are used, it supports the argument by simply referring back to the embodiment described in paragraph 44 of Rogers. As explained above, however, that embodiment is different from the one Petitioner relies on for the haptics limitation (claim element [1D1]). *See supra* § VI.C.2.a. Also, the claim requires a single sensor to be commonly used for claim element [1D-1] and claim element [1D-2], and thus Petitioner's argument further fails because it allegedly involves the use of *both* camera 108 and inertial sensor, which encompass two sensors. EX2001, ¶101.

As explained in greater detail above in §VI.C.3, Petitioner identifies the weapon reload use case in Rogers to show that haptics are determined based on the user tilting the weapon in an upward orientation. Pet., 77. Thus, Petitioner contends that haptic effects are based on "Inertial Tracking" sensor data. *Id.* As to the limitation of determining a modified visual effect for overlaying it on the object, Petitioner states that a modified visual effect "changes in correspondence with the detected location and orientation of interface object 104—i.e., computer 106's processor determines the '*modified visual effect*' that the user sees as virtual hands gripping a virtual weapon that points in the same direction detected for interface object 104, thus meeting [1D1]" citing the Rogers' disclosures at ¶¶[0018], [0043]-

[0045], [0052]-[0055], [0068]-[0070], [0106]-[0109]. Pet., 74. In other words, for the "modified visual effect" limitation, Petitioner relies on the "Object Tracking" sensor (i.e., camera).

Nowhere in these passages that Petitioner cites is there any indication that the alleged modified visual effect is determined based on the same inertial sensor data that haptic effects are based on. Indeed, various sensors other than inertial sensors are utilized in these descriptions. EX2001, ¶103. For example, in regards to the "virtual hands gripping a virtual weapon" that Petitioner describes (Pet., 74), Petitioner's citation to Rogers at ¶[0045] states: Using these various types of controllers, or *even simply hand gestures that are made and captured by one or more cameras*, it is possible to interface, control, maneuver, interact with, and participate in the *virtual reality environment presented on the HMD 102*. EX1010, ¶[0045] (emphasis added). Thus, this description shows that the camera is used for the modified visual effect claim element, not the inertial sensor that is used for haptics in mimicking a weapon reload. EX2001, ¶103. Therefore, Petitioner has failed to show that the same sensor is used for both claim elements [1D-1] and [1D-2].

A further example is Petitioner's citation to Rogers at ¶[0055] which states: *depending on the way the directional interface object 104 is being held*, the corresponding virtual reality view of the weapon will also be held in a similar

fashion, which provides a more realistic and corresponding view to the user.” A POSA would understand that inertial sensor data is not used here as Rogers explains that how a user holds the interface object is determined by a sensor that detects the amount of *contact* made on the trigger area by the user’s hand. *See, e.g.,* EX1010, ¶[0055] (“*If more surface area is being covered* by the user’s hand when the user’s hand is in a gripping position, on a particular side, that may be indicative of the way the user is holding the directional interface object 104”) (emphasis added); EX2001, ¶104.

Also, ¶[0052] of Rogers, which Petitioner cites to, explains that “camera 108 facing the user 100, may track the HMD102 and also track the directional interface object 104.” Although this paragraph also mentions inertial tracking, it is describing the processing of inertial data and that such processing can be performed in the HMD or transferred to a cloud gaming system. EX1010, ¶[0052] (“In one embodiment, it is possible to perform all processing on the HMD102, and the inertial tracking of the directional object interface 104, can be *processed by the circuitry of the HMD102*. In other embodiments, inertial data can be *transferred to a cloud gaming system*.”). In other words, inertial sensors are not used here for the purpose of superimposing a modified visual effect on the interface object.

Indeed, Rogers does not disclose overlaying a visual effect on the directional interface object using the same inertial sensors as those allegedly used for haptics.

EX2001, ¶105. As explained above in §VI.C.2.b, inertial sensors are used to generate inertial data indicative of the *movement of the directional interface object*, which can be used alongside captured images to determine the position of a virtual object in the virtual environment for visual overlay purposes. EX2001, ¶105. However, Rogers does not disclose overlaying the visual effect on the object using inertial sensor data alone. *Id.*

Accordingly, the Petition fails to show that Rogers discloses the determination of modified visual effects based on data received from the sensor, and thus, fails to show a reasonable likelihood of success in establishing that Rogers anticipates and/or renders obvious the claims of the '067 Patent.

5. Petitioner Fails to Show that Dependent Claims 2-8, 12, 15-20 are Anticipated by and/or Obvious over Rogers

Claims 2-8 depend from independent Claim 1. Claims 12 and 15-20 depend from independent Claim 11. As described above in §§ VI.C.2-4, the Petition fails to show that Rogers anticipates or renders obvious the challenged independent claims. For example, Petitioner has not shown that Rogers discloses the claimed limitation, “determine a modified visual effect based in part on data received from the sensor” as recited in Claims 1, 11, and 21. Therefore, Petitioner fails to show a reasonable likelihood of success in establishing that Rogers anticipates and/or renders obvious

dependent claims 2-8, 12, and 15-20 for the same reasons as those articulated above in §§VI.C.2-4 above.

VII. INSTITUTION SHOULD BE DENIED UNDER 35 U.S.C. § 314(a)

As explained above, Petitioner fails to set forth evidence establishing a reasonable likelihood that it will prevail, much less that such evidence is “compelling” under the Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation, PTO Director’s Memorandum (June 21, 2022) (“Interim Guidance”). As Director Vidal clarified, “the compelling merits standard is a higher standard than the standard for institution set by statute,” and is met “if it is **highly likely** that the petitioner would prevail with respect to at least one challenged claim.” *CommScope Technologies LLC, v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23, 3-4 (Feb. 27, 2023) (emphasis added). Moreover, a compelling merits inquiry is not a substitute for a full *Fintiv* analysis. *Id.*, 4.

The merits of the Petition are not compelling. As discussed above, Grounds 1-3 suffer from several deficiencies fatal to the merits, including, for example, Petitioner’s failure to show that Banerjee discloses the claimed “proxy object that comprises a haptic output device,” failure to show that Meglan discloses “determining of a haptic effect based in part on data received from a sensor,” and failure to show that Rogers discloses “a sensor for tracking a position of the proxy object,”

“determining a haptic effect based in part on data received from the sensor,” and “determining a modified visual effect based in part on data received from the sensor.”

In addition, under the Interim Guidance, a petition should not ordinarily be denied in accordance with the *Fintiv* factors where Petitioner has offered a *Sotera* stipulation “that if the IPR is instituted, the Petitioner will not pursue in the District Court Litigation any ground raised or that could have been reasonably raised in an IPR for the challenged patent.” The inverse is also true: if, as here, the Petitioner has not offered a *Sotera* stipulation, then the Board should exercise its discretion and deny institution on the basis that “Petitioner has not submitted a *Sotera*-type stipulation that would make discretionary denial inappropriate.” *Zhuhai Cosmox Battery Co., Ltd. v. Ningde Ampere Technology Limited*, IPR2023-00587, Paper 12 at 15, 27 (Sept. 22, 2023) (discretionarily denying institution where Petitioner stipulated not to re-raise same grounds in district court as in IPR but where stipulation “does not extend to any ground ‘that could have been reasonably raised,’ pursuant to *Sotera*.”)

Petitioner has not offered a *Sotera* stipulation—or even a weaker commitment not to assert duplicative grounds in the District Court proceeding—and thus the sound logic recognized in *Zhuhai* applies with even more force here. The Board should find that Petitioner’s decision not to offer a *Sotera* stipulation neutralizes the

effects of the pre-institution stay entered by the District Court, and merits denial under a holistic analysis of the *Fintiv* factors due to the duplication of the invalidity grounds asserted in the parallel District Court proceedings. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (Mar. 20, 2020) (precedential), 2-3; *see also Cisco Sys., Inc. v. Oyster Optics, LLC*, IPR2021-00238, Paper 10 (PTAB Jun. 1, 2021) (Panel exercising discretion to deny institution after holistic analysis of *Fintiv* factors).

A. Whether the Court Granted a Stay or Evidence Exists That One May Be Granted if a Proceeding Is Instituted

The first *Fintiv* factor addresses the likelihood of a stay if this proceeding is instituted. Patent Owner recognizes that a stay of District Court proceedings, when coupled with a *Sotera* stipulation, can make discretionary denial under *Fintiv* inappropriate. But here, Petitioner has not offered a *Sotera* stipulation, and there is no reason to conclude that the District Court's stay reflects any analysis regarding the merits of Petitioners' invalidity defense. As such, the Board should not weigh the pre-institution stay against using its discretion to deny institution.

Here, the District Court in the Western District of Washington instituted a stay of proceedings despite the fact that (a) no institution decisions have been made on any of the seven patents asserted in the District Court litigation; (b) Petitioner did not offer a *Sotera* stipulation; (c) Petitioner has not asked the Board to construe any terms; and (d) contrary to Petitioner's insistence, in seeking the stay, that the mere

filing of its IPR petitions will inevitably simplify the District Court case, only 29 of the 463 patent claims owned by Immersion that have been subject to IPR proceedings have been canceled, and in each of those cases the challenging party ultimately took a license to Immersion's patents.³ Because the District Court entered the stay (a) before the Board has made any institution decisions and (b) before the District Court had the opportunity to consider the merits of Petitioner's invalidity positions, and further (c) the District Court's order entering the stay contains no analysis of the merits of Petitioner's invalidity positions, there is no reason for the Board to infer that the District Court's entry of the stay reflects its assessment of the merits of Petitioner's invalidity positions. EX2004. The Board should thus give the stay little weight in its *Fintiv* analysis because if the Board denies institution and the stay is lifted, the litigation can resume status quo ante.

B. Proximity of the Court's Trial Date to the Board's Projected Deadline for a Final Written Decision

In the parallel Western District of Washington litigation, before the Court stayed the case the District Court set trial for June 2025 (EX2005, 1), approximately

³<https://www.businesswire.com/news/home/20180129005190/en/Immersion-Reaches-Global-Settlement-With-Apple>.

1.5 months before the expected Final Written Decision date in July 2025 if the Board institutes proceedings. If the Board denies institution and the matter proceeds with an approximate delay of 3.5 to 4 months from the previous schedule, the District Court action will head to trial on or about December 2025. Moreover, the District Court can hear not only Petitioner's invalidity defense but can resolve infringement and damages. Especially in light of Petitioner's failure to offer a *Sotera* stipulation, it is more efficient to allow this matter to proceed in District Court.

C. Investment in the Parallel Proceeding by the Court and the Parties

The third *Fintiv* factor addresses investment into the parallel proceeding. Here, the parties have already invested time and effort in the District Court such that Institution would be inefficient. The parties served invalidity and infringement contentions over six months and two months ago respectively (EX2005, 1-2, EX2006), and were in the midst of claim construction briefing when the Court stayed the case (EX2005, 2). Fact discovery in the parallel litigation was underway and could efficiently be resumed if the stay is lifted. EX2005.

Petitioner has already served nearly 2000 pages of invalidity contentions including the same Banerjee, Meglan, and Rogers references that are asserted in this IPR, as well as similar references with cumulative subject matter. EX2006, 9-10. As

a result of this overlap, and the absence of a *Sotera* stipulation, there will be no inefficiencies that result from resuming proceedings in front of the District Court.

D. Overlap Between the Issues Raised in the Petition and the Parallel Proceeding

The fourth *Fintiv* factor, which addresses the overlap between the issues raised in the Petition and the parallel proceeding, should also weigh in favor of denial. In the parallel litigation, Petitioner has attacked the validity of the challenged claims in view of the same prior art addressed here. EX2006, 9-10.

By failing to offer a *Sotera* stipulation, Petitioner has not even indicated that it would reduce its invalidity assertions based on the outcome of the Board's institution decision. Petitioner is seeking two bites at the apple. This violates the fundamental tenet of IPRs, which is that a litigant cannot hedge its bets on the forum in which to pursue invalidity until it can better weigh its chances, but instead should make a decision regarding where it wishes to litigate invalidity and honor that decision. 77 Fed. Reg. 48680-01 (Aug. 14, 2012) (IPRs are intended “to create a timely, cost-effective **alternative** to litigation”) (emphasis added).

E. Whether the Petitioner and the Defendant in the Parallel Proceeding are the Same Party

The fifth *Fintiv* factors addresses whether the Petitioner and the defendant in the parallel proceeding are the same party. Petitioner admits that it is the defendant

in the parallel litigation. Pet., 75. This factor weighs in favor of denial. *Cisco Sys., Inc. v. Oyster Optics, LLC*, IPR2021-00238, Paper 10, 16-17.

F. Other Circumstances That Impact the Board's Exercise of Discretion, Including the Merits

Finally, the sixth *Fintiv* factor addresses other circumstances that impact the Board's discretion. Patent Owner raises substantive reasons why the Petition should be denied on the merits. These reasons are also relevant to discretionary denial.

VIII. CONCLUSION

Petitioner has not established a reasonable likelihood that it will prevail on Grounds 1-3 to establish unpatentability of Challenged Claims 1-8, 11-12, 15-21 of the '067 Patent, and therefore the Board should decline to institute *inter partes* review.

Patent Owner's Preliminary Response
IPR2024-00557 (U.S. Patent No. 10,665,067)

Respectfully Submitted,

Dated: May 15, 2024

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(Case No. IPR2024-00557)

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CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the word count for all portions of the foregoing Patent Owner's Preliminary Response totals 11,570 words per Microsoft Word, which complies with the requirement of 14,000 words allowed under 37 C.F.R. § 42.24(d).

Dated: May 15, 2024

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CERTIFICATE OF SERVICE

As authorized by Patent Owner's Mandatory Notice, I hereby certify that on May 15, 2024, a copy of this document has been served in its entirety by electronic mail on Petitioner's lead and backup counsel.

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