UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

META PLATFORMS, INC.,
Petitioner

v.

MULLEN INDUSTRIES LLC,
Patent Owner.

Case IPR2025-00742
U.S. Patent No. 11,904,243 B2
Issue Date: February 20, 2024

Title: SYSTEMS AND METHODS FOR LOCATION BASED GAMES AND EMPLOYMENT OF THE SAME ON LOCATION ENABLED DEVICES

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 11,904,243 B2

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List of Exhibits

Exhibit No.	Description of Document
1001	U.S. Patent No. 11,904,243 B2 to Jeffrey David Mullen (filed July 15, 2007, issued February 20, 2024) ("**'243**" or "**'243 patent**")
1002	Declaration of Jeremy Cooperstock, Ph.D. ("**Cooperstock**")
1003	U.S. Patent App. Pub. No. 2004/0110565 A1 to Louis Levesque (filed Dec. 4, 2003; published Jun. 10, 2004) ("**Levesque**")
1004	U.S. Patent App. Pub. No. 2002/0163486 A1 to Peter A. Ronzani et al. (filed May 16, 1997; published Nov. 7, 2002) ("**Ronzani**")
1005	U.S. Patent App. Pub. No. 2004/0104934 A1 to Jan G. Fager *et al* (filed February 7, 2002; published June 3, 2004) ("**Fager**")
1006	U.S. Patent No. 6,951,515 B2 to Toshikazu Ohshima et al., "Game Apparatus for Mixed Reality Space, Image Processing Method Thereof, and Program Storage Medium" (filed Feb. 17, 2000; issued Oct. 4, 2005) ("**Ohshima**")
1007	U.S. Patent App. No. 10/932,536 (filed September 1, 2004) ("2004 Utility Application")
1008	U.S. Provisional Application no. 60/499,810 (filed Sep. 2, 2003) ("2003 Provisional")
1009	U.S. Provisional Application no. 60/603,481 (filed Aug. 20, 2004) ("2004 Provisional")
1010	U.S. Provisional Application no. 60/430,682 (filed Dec. 4, 2002) ("Levesque Provisional")
1011	Redline between Levesque and Levesque Provisional
1012	Petitioner's Opening Claim Construction Brief in *Mullen Industries LLC v. Meta Platforms, Inc.*, No. 1:24-cv-00354-DAE (W.D. Tex.) (dated Feb. 26, 2025)
1013	Proof of Service of Complaint

I. MANDATORY NOTICES UNDER §42.8(A)(1)

A. Real Party-In-Interest under §42.8.(b)(1)

Meta Platforms, Inc. is the real party-in-interest to this IPR petition.

B. Related Matters under §42.8(b)(2)

The '243 patent (**EX1001**) is the subject of pending litigation involving Petitioner: *Mullen Industries LLC v. Meta Platforms, Inc.*, Case No. 1:24-cv-00354-DAE (W.D. Tex.). Petitioner was served on April 5, 2024. (EX1013, p.003.)

Petitioner is filing IPR petitions against twelve related patents asserted by Patent Owner in the pending litigation involving Petitioner:

U.S. Patent No.	IPR Case
8,585,476 B2	IPR2025-00737
9,744,448 B2	IPR2025-00738
10,179,277 B2	IPR2025-00739
10,828,559 B2	IPR2025-00740
10,967,270 B2	IPR2025-00702
11,033,821 B2	IPR2025-00703
11,376,493 B2	IPR2025-00741
11,904,243 B2	IPR2025-00742
11,947,716 B2	IPR2025-00743
12,019,791 B2	IPR2025-00744
9,662,582 B2	IPR2025-00745
10,974,151 B2	IPR2025-00746

C. Lead and Back-Up Counsel under §42.8(b)(3)

Petitioner provides the following designation of counsel.

LEAD COUNSEL	BACK-UP COUNSEL
Heidi L. Keefe (Reg. No. 40,673) hkeefe@cooley.com COOLEY LLP ATTN: Patent Group 1299 Pennsylvania Ave. NW, Suite 700 Washington, DC 20004 Tel: (650) 843-5001 Fax: (650) 849-7400	Phillip E. Morton (Reg. No. 57,835) pmorton@cooley.com Andrew C. Mace (Reg. No. 63,342) amace@cooley.com Mark R. Weinstein (Admission *pro hac vice* to be requested) mweinstein@cooley.com Lowell D. Mead (Admission *pro hac vice* to be requested) lmead@cooley.com Patrick Lauppe (Admission *pro hac vice* to be requested) plauppe@cooley.com COOLEY LLP ATTN: Patent Group 1299 Pennsylvania Ave. NW, Suite 700 Washington D.C. 20004

D. Service Information

This Petition is being served by Federal Express to the attorney of record for the ’243 patent, 32733 - JEFFREY D. MULLEN, 2212 Hassinger Lane, Glenshaw, PA 15116. Petitioner consents to electronic service at the addresses provided above for lead and back-up counsel.

II. FEE PAYMENT

Petitioner requests review of fifteen claims, with a $51,875 payment.

III. REQUIREMENTS UNDER §§ 42.104 AND 42.108 AND CONSIDERATIONS UNDER §§ 314(A) AND 325(D)

A. Grounds for Standing

Petitioner certifies that the '243 patent is available for IPR and that Petitioner is not barred or otherwise estopped.

B. Identification of Challenge and Statement of Precise Relief Requested

Petitioner requests IPR institution based on:

Ground	Claims	Basis for Challenge under §103
1	1, 6-8, 17, 24-28, 30	Levesque in view of Ronzani
2	9, 10, 22	Ronzani in view of Ronzani and Fager
3	14	Ronzani in view of Ronzani and Ohshima

Submitted herewith is the expert declaration of Jeremy Cooperstock, Ph.D. (**EX1002**) ("Cooperstock"). (EX1002, ¶¶1-18, Appendix A.)

C. Considerations Under §§ 314(a) and 325(d)

§314(a): The *General Plastic* factors are inapplicable as this is the first and only IPR petition filed regarding the '243 patent.

The *Fintiv* factors do not support discretionary denial under §314(a). The pending litigation against Petitioner is in early stages. Trial is scheduled for October 5, 2026. Petitioner's motion to transfer venue is pending, which if granted would likely move trial even later. Petitioner intends to move to stay the litigation

pending resolution of the IPRs. If IPR is instituted, Petitioner will not pursue in litigation any invalidity defense that was or could have been raised in IPR.

§325(d): No §325(d) issue is raised here. No relied-upon reference was cited during prosecution.

Petitioner reserves the right to address and respond to any assertions that Patent Owner may raise regarding discretionary factors.

IV. OVERVIEW OF THE PATENT

A. Level of Ordinary Skill

A person of ordinary skill ("POSITA") would have possessed a bachelor's degree in electrical engineering, computer science, or similar field, with two years combined experience in designing and/or developing computer systems/software involving interactive graphical virtual and/or augmented reality. A person could also have qualified as a POSITA with some combination of (1) more formal education (such as a master's of science degree) and less technical experience, or (2) less formal education and more technical or professional experience. (Cooperstock, ¶¶21-25.)

V. CLAIM CONSTRUCTION

Petitioner does not believe express claim construction is necessary at this time. The prior art renders the challenged claims obvious under any reasonable construction.

VI. THE CHALLENGED CLAIMS ARE UNPATENTABLE

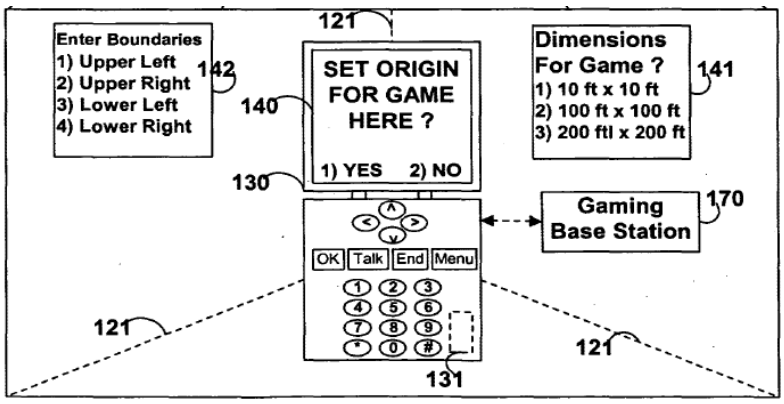
A. Prior Art Status of Relied-Upon References

Pre-AIA law applies to the challenged claims, and each reference cited in the grounds qualifies as prior art to the '243 patent. Levesque (**EX1003**), Ronzani (**EX1004**), Fager (**EX1005**), and Ohshima (**EX1006**) qualify as prior art to the '243 patent based on the filing date of a utility application to which the '243 patent claims priority—*i.e.*, September 1, 2004, the filing date of U.S. Patent App. No. 10/932,536 ("2004 Utility Application"; **EX1007**). Levesque qualifies as prior art under §§ 102(a) or (e), because it was published on June 10, 2004 and its provisional application (60,430,682) was filed on December 4, 2002. Ronzani qualifies as prior art under §§ 102(a), (b), or (e), including because it was filed May 16, 1997 and published November 7, 2002. Fager qualifies as prior art under §§ 102(a) or (e), including because it was filed February 7, 2002 and published June 3, 2004. Ohshima qualifies as prior art under §§ 102(a), (b), or (e), because it was filed February 17, 2000 and published February 13, 2003.

The '243 patent cannot claim priority to either of its two provisional applications—no. 60/499,810 filed September 2, 2003 ("2003 Provisional"; **EX1008**), and no. 60/603,481, filed August 20, 2004 ("2004 Provisional"; **EX1009**)—because neither provides support for the claim 1 limitation: "**wherein said processing circuitry is operable to execute said computer programming to**

allow said user of said head-mounted device to manually set one or more boundaries for said location based game." (Cooperstock, ¶¶44-46.) With respect to the 2003 Provisional, the word "boundary" does not appear, nor do the figures illustrate a boundary—let alone a boundary manually set by the user of the head-mounted device. (EX1008; Cooperstock, ¶44.) As to the 2004 Provisional, it mainly describes a wireless device with only a passing mention of games. (EX1009, p.0007:23-25; Cooperstock, ¶44.) It uses the word "boundary" only once, in describing a housing portion of a device, not a game boundary. (EX1009, p.0013:9-12 ("boundary defined by housing portion 701").)

In contrast, the 2004 Utility Application at least states, for example, that "GUI 412 may be provided in which a user may go to a physical playfield boundary that the user desires and establish that location as a location boundary for a game." (EX1007, pp.0015:33-0016:3; Cooperstock, ¶45.) Similarly, the application includes a new Figure 1:



(EX1007, Fig. 1 (excerpt); Cooperstock, ¶45.)

Even if the '243 were able to claim priority to either of its provisional applications (resulting in a September 2, 2003 or August 20, 2004 priority date), Levesque, Ronzani, Fager, and Ohshima would qualify as prior art. Ronzani would qualify as prior art at least under §§ 102(a) or (e), including because it was filed May 16, 1997 and published November 7, 2002. Fager would qualify as prior art under at least § 102(e), including because it was filed February 7, 2002. Ohshima would qualify as prior art under §§ 102(a) or (e), because it was filed February 17, 2000 and published February 13, 2003.

Levesque would qualify as prior art under § 102(e), because it is entitled to the priority date of its provisional application (no. 60/430,682) filed on December 4, 2002. ("Levesque Provisional"; **EX1010**). A patent is entitled to the benefit of a provisional application filing date "if the disclosure of the provisional application provides support for the claims in the reference patent in compliance with §112 ¶ 1." *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1381 (Fed. Cir. 2015). *First*, the provisional application must provide "sufficient support for at least one claim in the child." *Ex Parte Mann*, Appeal 2015-003571, 2016 WL 7487271, at *5 (PTAB Dec. 21, 2016). *Second*, "the subject matter relied upon in the non-provisional" must be "sufficiently supported in the provisional application." *Id.* Both requirements are satisfied for Levesque.

The first requirement is met because the disclosures in Levesque cited below were contained, often identically, in the Levesque Provisional. (Cooperstock, ¶67.) **Exhibit 1011** is a redline document between the Levesque Provisional and Levesque. (*Id.*) As shown in the redline, any disclosures cited in Levesque that are not contained substantially identically in the Levesque Provisional are cumulative of disclosures in the Levesque Provisional. (*Id.*) For example, paragraph 37 of Levesque describes multi-player gaming, but multi-player gaming is also described in paragraphs 24, 39, and 40, which correspond to paragraphs 20, 33 and 34 of the Levesque Provisional. (Levesque Provisional, ¶¶20, 33, 34.) The figures in both, although sometimes rendered differently, are also substantively the same for purposes of the below analysis. (Cooperstock, ¶67.)

With respect to the second requirement, the Levesque Provisional provides sufficient written description and support for at least claim 1 of Levesque. (Cooperstock, ¶68.)

A. Ground 1: Claims 1, 6-8, 17, 24-28, and 30 Are Obvious Over Levesque in view of Ronzani

1. Independent Claim 1: "A location based game system comprising:" (Claim 1[pre])

Assuming the preamble is limiting, **Levesque** discloses "[**a**] **location based game system**" as explained further below. (Cooperstock, ¶¶89-90; Levesque, ¶¶8-9, 25, 33; *see also* Cooperstock, ¶¶54-64.)

For example, Levesque describes a "video gaming device includ[ing] a central gaming unit in communication with a heads-up display and a location sensing sensor." (Levesque, ¶8.) Figures 1 and 2 of Levesque show a gaming unit **12**, which contains processor **30** and memory **32** and connects to heads-up display **20**, sensors including GPS sensor **14** and external sensors **18**, and a wireless network through network interface **36**.

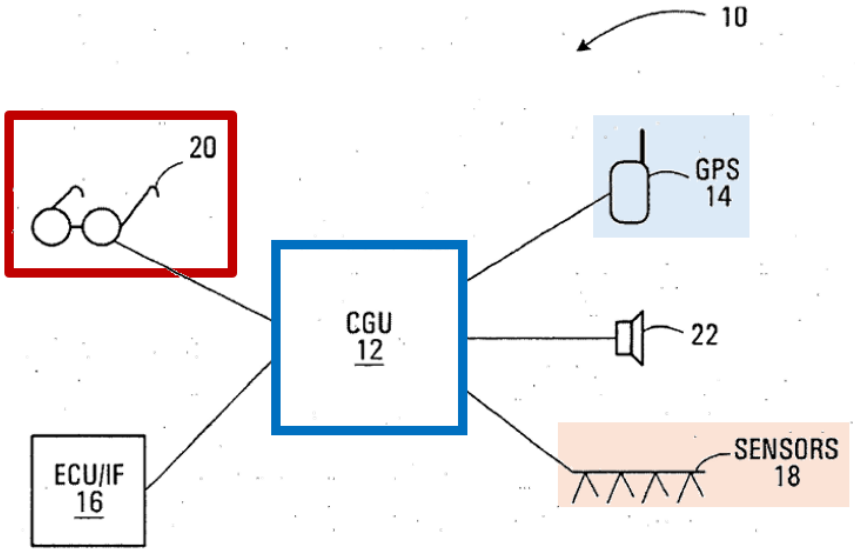


FIG. 1

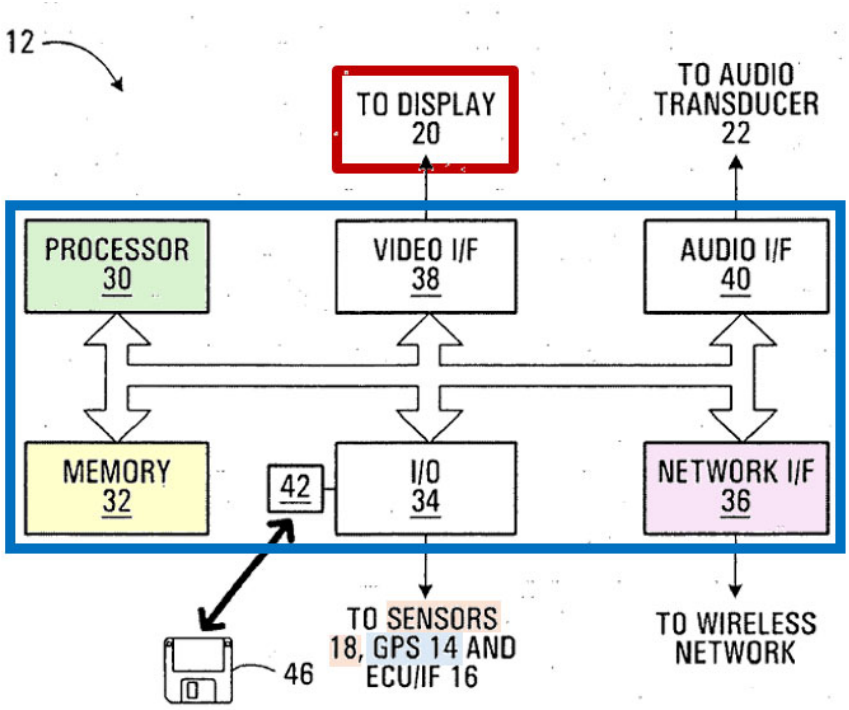


FIG. 2

(Levesque, Figs. 1-2 (highlighting and annotation added), ¶¶18-28; Cooperstock, ¶¶54-64.)

(a) "a head-mounted device operable to provide a location based game in a semi-visible environment in which a user of said head-mounted device can simultaneously view at least a portion of a real-world environment around said user as well as virtual indicia for said location based game, said virtual indicia comprising at least one of a virtual game character and a virtual interactive object;" (Claim 1[a])

Levesque discloses claim 1[a]. Levesque discloses "**a head-mounted device**," such as "integrated eye glasses" or a "helmet visor" that includes a "heads-up display **20**." (Levesque, ¶24; Cooperstock, ¶91.)

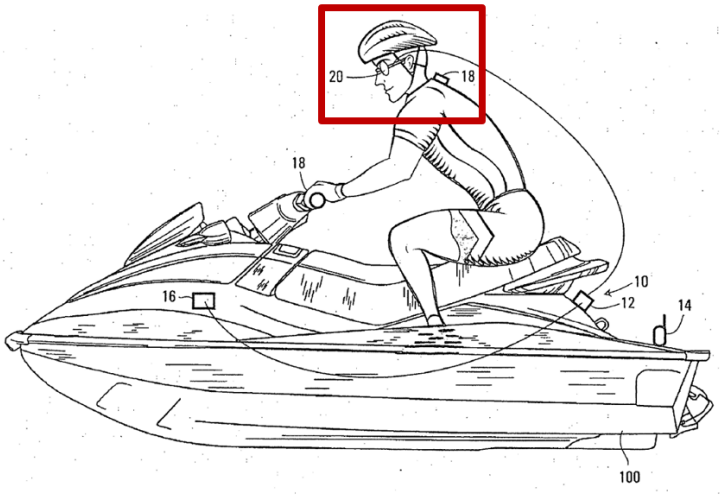


FIG. 3

(Levesque, Fig. 3 (annotation added), ¶¶30-31; Cooperstock, ¶91.)

Levesque discloses that its head-mounted device is "**operable to provide a location based game**." (Cooperstock, ¶92.) For example, Levesque discloses that its head-mounted provides games (like the one shown in Figure 4) that use inputs from "a location sensing sensor" to control gameplay (*e.g.*, interact with opponents, avoid enemy fire, etc.)

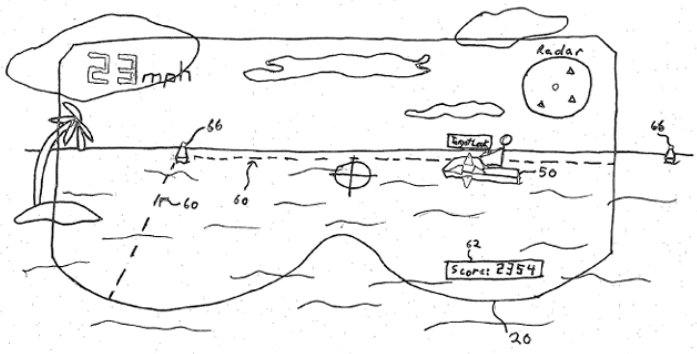


Fig. 4

(Levesque, Fig. 4, ¶¶9, 34, 39-40.)

Levesque discloses that its head-mounted device provides a location-based game "**in a semi-visible environment in which a user of said head-mounted device can simultaneously view at least a portion of a real-world environment around said user as well as virtual indicia for said location based game**." (Cooperstock, ¶¶93-96.) For example, Figure 4 of Levesque shows the user simultaneously viewing both "**a portion of a real-world environment**" (*e.g.*, the ocean and sky) as well as "**virtual indicia**" for the location-based game, including virtual boundary **60**, simulated opponent **50**, score **62**, speed, crosshairs, and radar display:

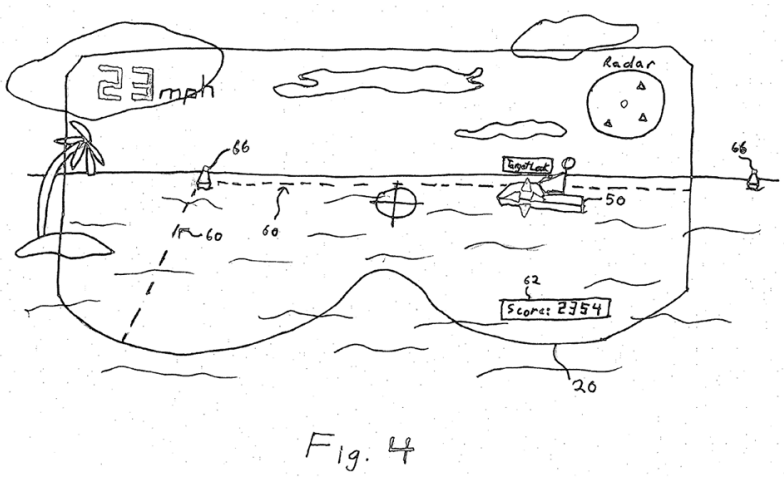


Fig. 4

(Levesque, Fig. 4, ¶34; Cooperstock, ¶93; *see also* Levesque, Figs. 6, 8.) Levesque also discloses that heads-up display **20** "allows an operator to view an image without diverting his or her eyes from their normal point of focus" and to "view an electronically presented image without unduly obstructing the user's view." (Levesque, ¶24; *see also id.*, ¶¶20, 31, 40.)

In the district court litigation, Petitioner is asserting that "**semi-visible environment**" is indefinite as to its full scope. Petitioner is also asserting that there are example scenarios that would be included in the claim scope—*e.g.*, "a display half-filled with virtual objects persistently blocking a user of average vision from seeing the corresponding real-world objects 'behind' them[.]" (EX1012, p.0018.) Levesque discloses a "semi-visible environment" at least within Petitioner's provided example claim scope. (Cooperstock, ¶96.) For example, Figure 6 shows virtual indicia indicating user speed that blocks the user's view of a real-world cloud:

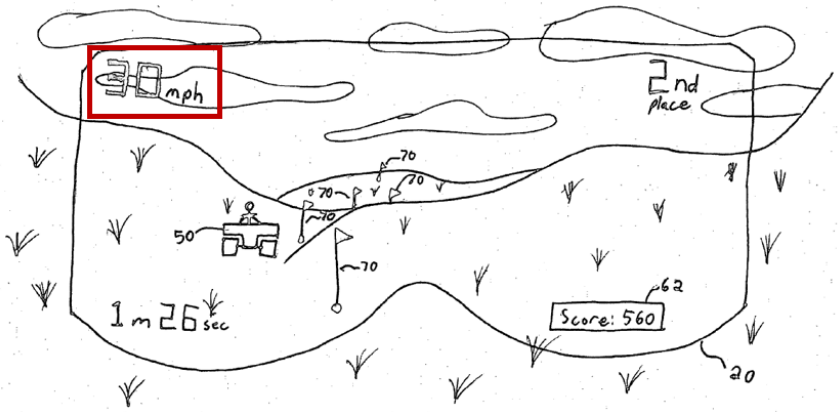


Fig. 6

(Levesque, Fig. 6 (annotation added); Cooperstock, ¶96.) Levesque also discloses "allowing the user to view an electronically presented image without unduly obstructing the user's view." (Levesque, ¶24.)

Regarding the last portion of of claim 1[a], Levesque discloses that its head-mounted device provides "**virtual indicia comprising at least one of a virtual game character and a virtual interactive object**." (Cooperstock, ¶¶97-100.)

Levesque describes displaying "**virtual game character[s]**" such as virtual (or simulated) opponents, including "virtual opponents **50**" shown in Figure 4:

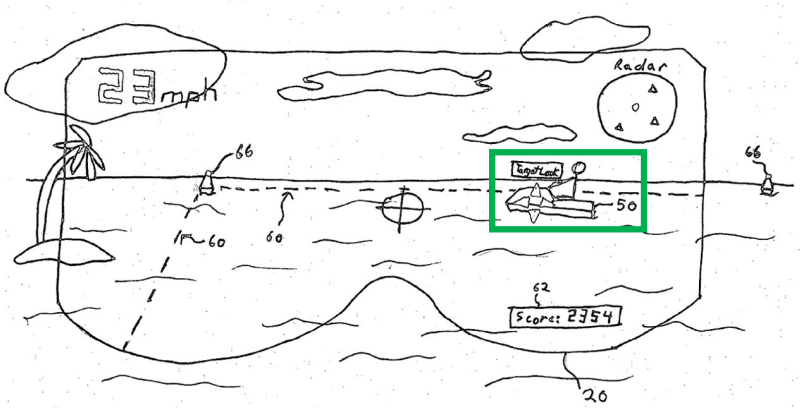


Fig. 4

(Levesque, Fig. 4 (annotation added), ¶34; Cooperstock, ¶98; *see also* Levesque, ¶40, Figs. 5-6.) Levesque also describes displaying "**virtual interactive object[s]**," including "weapon fire from opponents **50**" and virtual obstacles **70** with which the user can interact. (Cooperstock, ¶99; Levesque, ¶¶34, 39, Figs. 4-6, 8.) For example, a user can interact with weapon fire from opponents **50**, using "[a]ctual motion of the vehicle to avoid launched weapons," and a user can "steer the vehicle to avoid collision with" virtual obstacles **70**:

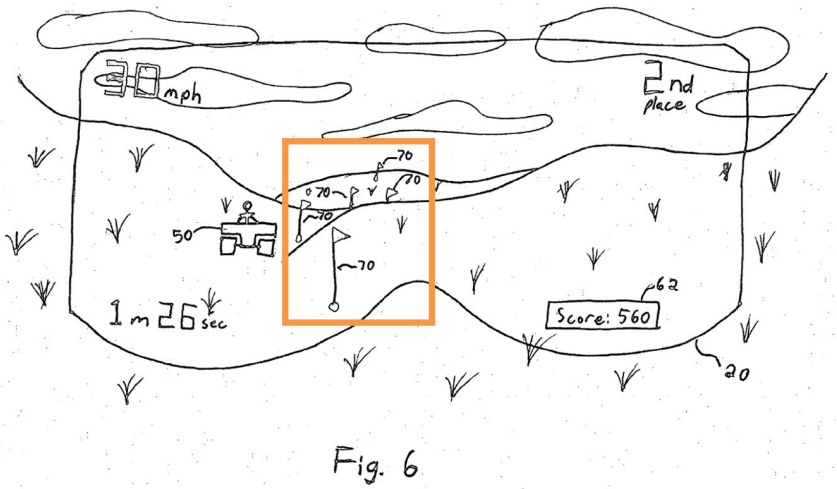


Fig. 6

(Levesque, Fig. 6, ¶39; Cooperstock, ¶99.)

Petitioner asserts in litigation that the term "**virtual**" should be construed as "not real world." (EX1012 at pp.0007-0011.) Levesque satisfies the claim language regardless of whether Petitioner's proposed construction is adopted. (Cooperstock, ¶¶91-100.) For example, the "virtual indicia," "virtual game character," and "virtual interactive object" elements Levesque discloses are part of the game provided by video gaming device—thus, they are "not real world."

(b) "processing circuitry in said head-mounted device;" (Claim 1[b])

Levesque with **Ronzani** discloses and renders obvious claim 1[b]. (Cooperstock, ¶¶101-116.) Levesque discloses "**processing circuitry**," such as processor **30** contained in gaming unit **12** connected to heads-up display **20**:

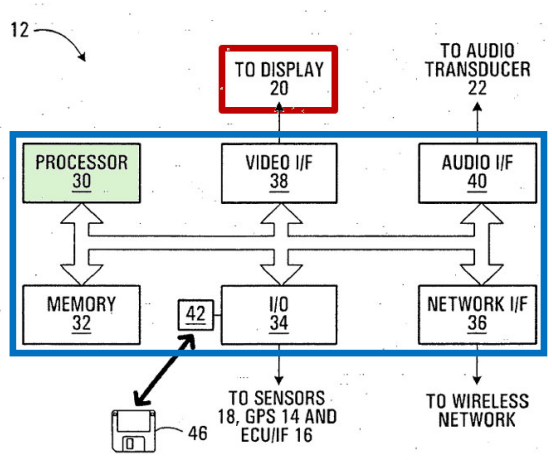


FIG. 2

(Levesque, Fig. 2 (highlighting and annotation added), ¶¶19-20; Cooperstock, ¶102.) Levesque discloses that the processor is "in communication with processor readable memory" (which contains gaming software), and a location sensor—so that it can "present a video game whose play is controlled by location of the gaming device, as sensed by the location sensor." (Levesque, ¶10; *see also id.*, ¶19.) Processor **30** is "any suitable processor capable of processing processor executable instruction of sufficient complexity and at sufficient speed to present a near real-time gaming environment to an end-user." (*Id.*, ¶20.)

Levesque discloses that gaming unit **12** including processor **30** and other components is located on a vehicle—for example, near the seat of a watercraft:

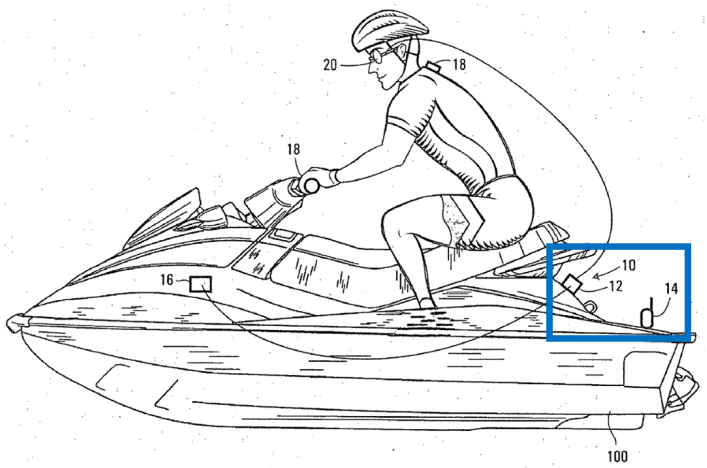


FIG. 3

(Levesque, Fig. 3 (annotation added); Cooperstock, ¶103.) A POSITA would have been motivated to place a processor and other hardware components inside a head-mounted device in light of **Ronzani**. (Cooperstock, ¶¶103-116.)

For example, Ronzani discloses various head-mounted displays containing hardware such as a processor, memory, and first and second locating device. (*See, e.g.*, Ronzani, Figs. 35-45, ¶¶162-205; Cooperstock, ¶¶104, 71-76.) Ronzani generally discloses that "[t]he computer and associated electronic components used to load programs, load and store data and communicate or network with other systems by wire or wireless operation can be mounted on the head-piece[.]" (Ronzani, ¶7 (emphasis added).) Ronzani further discloses that a head-mounted display can be fully "self-contained." (*See* Ronzani, ¶94; Cooperstock, ¶104.) Ronzani discloses many such embodiments. (*See* Ronzani, Figs. 32A, 32B, 33, 34A-D, 35-45, ¶¶150-151, 154-156, 159-166, 169, 172-176, 179-183, 186-197, 200-202, 205; Cooperstock, ¶104.) For example, Figure 35 shows components in a "head-

mounted computer **710**":

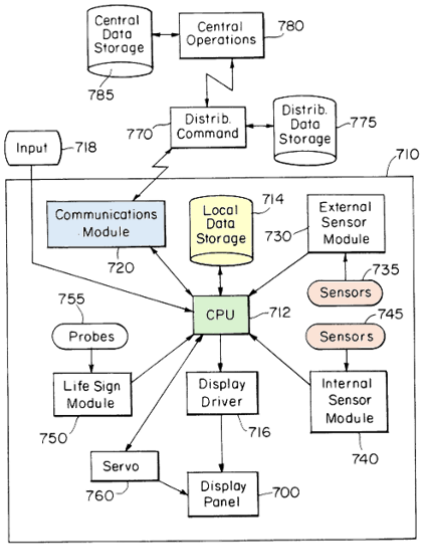


Fig. 35

(Ronzani, Fig. 35 (highlighting added), ¶¶162-171; Cooperstock, ¶104.) Ronzani discloses that the "general purpose" head-mounted computer **710** can be adapted "for use in many real world situations," including the embodiments in Figures 37-45. (Ronzani, ¶¶173-205; Cooperstock, ¶104.)

Ronzani's head-mounted computer **710** includes CPU **712**. (Ronzani, ¶162, Fig. 35; *see also id.*, Figs. 36-45, ¶¶172, 176-178, 184-187, 192-193, 197-199, 201-204; Cooperstock, ¶105.) Ronzani also discloses other head-mounted hardware components, which are discussed for additional claim limitations below—*e.g.*, claims 1[c], 1[d], 1[e], 17, and 24.

In light of such disclosures, it would have been obvious to include sensors and hardware for Levesque's video gaming device in a head-mounted device, such that

a user's line of sight and location could be tracked as the user moves around the real world, including by walking or running without the use of a vehicle. (Cooperstock, ¶¶107-116.) Levesque itself discloses sensors worn by a user, including to detect line of sight, and heads-up display **20**. (Levesque, ¶¶24, 26.) These wearable devices would have motivated a POSITA to consider what other components could be placed in a head-mounted unit. (Cooperstock, ¶107.)

Rationale and Motivation to Combine (Levesque and Ronzani): It would have been obvious to combine Ronzani's teachings regarding a head-mounted device that includes a processor, memory storing computer programming capable of execution by said processing circuitry, and GPS sensor (along with other components discussed below) with Levesque. (Cooperstock, ¶¶106, 108.) The combination would have involved the straightforward incorporation of Levesque's hardware components (including processor, memory, and sensors) into the head-mounted part of Levesque's video gaming device and would have predictably resulted in a self-contained head-mounted video gaming device. (*Id.*, ¶108.) The combination discloses and renders obvious a "**processing circuitry in said head-mounted device**," among other limitations discussed below. (*Id.*, ¶108.)

Both Levesque and Ronzani are analogous references to the '243 patent. Like the '243 patent, Levesque and Ronzani are in the field of portable user-worn devices for providing location-based entertainment. (Cooperstock, ¶109; '243, 2:28-51

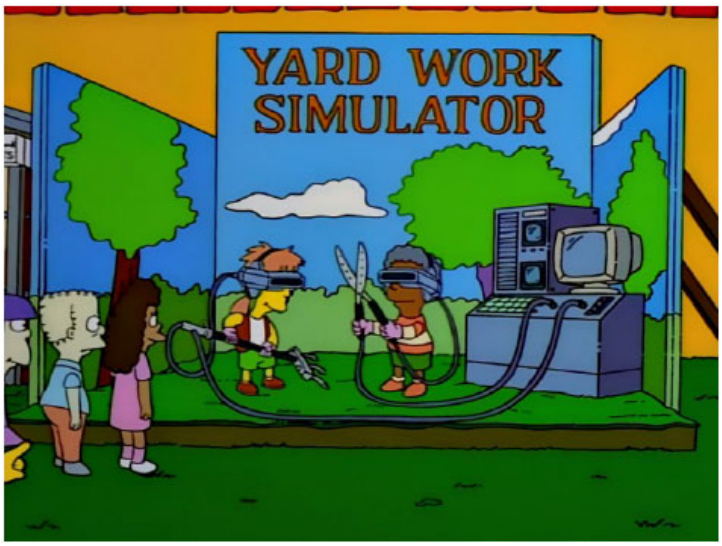
(describing "an actual, reality-based video game and "displays" for "location-based games"), 1:22-23; Levesque, ¶¶2 (relating to "mobile electronic video games."), 8; Ronzani, ¶¶5 ("systems and methods for mounting display and electronic systems on the human body for numerous applications including … entertainment purposes"), 2.) Further, both Levesque and Ronzani would have been reasonably pertinent to problems facing the '243 patent inventor, including head-mounted display components and features device for applications like generating and displaying virtual elements.

For example, a POSITA would have been motivated to place a processor and other hardware components inside the head-mounted part of Levesque's video gaming device to allow use of the device without a vehicle—*e.g.*, when a user is walking around. (Cooperstock, ¶110.) Levesque discloses that "nearly an infinite variety of gaming software" can take advantage of a system comprised of "display **20**, location sensor **14** and sensors **18**"—without indicating that a vehicle is necessary to such gaming software. (Levesque, ¶43; Cooperstock, ¶110.) Levesque further discloses video games used with "sports and exercise activity." (Levesque, ¶6.) Allowing use of Levesque's video gaming device without a vehicle would allow many additional sports and exercise games. (Cooperstock, ¶110.) A POSITA would have been motivated to allow use of Levesque's video gaming device without a vehicle to expand the use cases for the device. (Cooperstock, ¶110, *see* Levesque,

¶¶2, 6, 7.)

Further, a POSITA would have been motivated to make Levesque's system into a self-contained head-mounted device to enable its use with *different* vehicles. (Cooperstock, ¶111.) A POSITA would have understood that placing hardware on a particular vehicle (like the "personal watercraft" of Levesque's Figure 3) would limit Levesque's gaming system to use with that specific vehicle. (*Id.*; Levesque, Figs. 2-3, ¶¶19-20, 30.) A POSITA would have been motivated to enable use with different vehicles. (Cooperstock, ¶111.) For example, a POSITA would have been motivated by Levesque's disclosure of different types of vehicles for its gaming device, including "a recreational vehicle in the form of a snowmobile, all terrain vehicle or personal watercraft." (*Id.*; Levesque, ¶8; *see also id.*, ¶¶24 ("automobile"), 30 ("snowmobile" and "all-terrain vehicle").)

A POSITA would have looked to Ronzani for details on how to implement a head-mounted video gaming system like Levesque's without using a vehicle. (Cooperstock, ¶112.) Ronzani explains that its head-mounted displays have broad application, including "entertainment purposes." (Ronzani, ¶5.) A POSITA would have therefore



appreciated the clear applicability of Ronzani's teachings to Levesque's gaming system. (Cooperstock, ¶112.) Even putting aside Ronzani's express recognition of "entertainment purposes," a POSITA would have appreciated the applicability of Ronzani's commercial and industrial embodiments, such as for firefighting and military use. (*Id.*) After all, as anyone knows, there may be little or no difference between what one considers "work" and another considers "fun." (*Id.*) This was illustrated in a 1998 episode of *The Simpsons* in which children happily play a virtual reality "yard work simulator" (see figure at right). With respect to Ronzani, a POSITA would have recognized that military use could include simulated "war games." This is consistent with the '243 patent, which indicates that a user's controller could take the form of a gun. ('243, 19:36-39; Cooperstock, ¶112.) Indeed, a POSITA would have been aware of the popularity of "first-person shooter" video games, including military simulations. (Cooperstock, ¶112.)

Ronzani discloses head-mounted display designs that are entirely self-contained, allowing a user to move around while carrying all the necessary hardware in the head-mounted display. (Cooperstock, ¶113; Ronzani, ¶94; *see also id.*, Figs. 35-45, ¶¶162-205.) Furthermore, Ronzani discloses that its designs are "light-weight," "compact," and "non-intrusive," which would have motivated a POSITA to look to Ronzani for implementation details of a self-contained Levesque system. (Cooperstock, ¶113; Ronzani, ¶¶4, 8.) Ronzani also discloses that its head-mounted

display can be "adapted for use in many real world situations[,]" which "typically involve applications where the wearer desires or needs auxiliary sensory input." (Ronzani, ¶173.) A POSITA would have understood that Levesque's location-based games represent such an application—*i.e.*, the auxiliary sensory input of virtual objects presented alongside real-world elements in Levesque's location-based games. (Cooperstock, ¶113; Levesque, Figs. 3-6, ¶¶30-39.)

A POSITA would have looked to combine Levesque with embodiments of Ronzani that include all components necessary for running Levesque's location-based games within Ronzani's self-contained design. (Cooperstock, ¶114.) For example, a POSITA would have looked to Ronzani's Figure 37 embodiment, which includes a head-mounted computer **710A**, local data storage **714**, and GPS sensor in communication module **720A**, among other components:

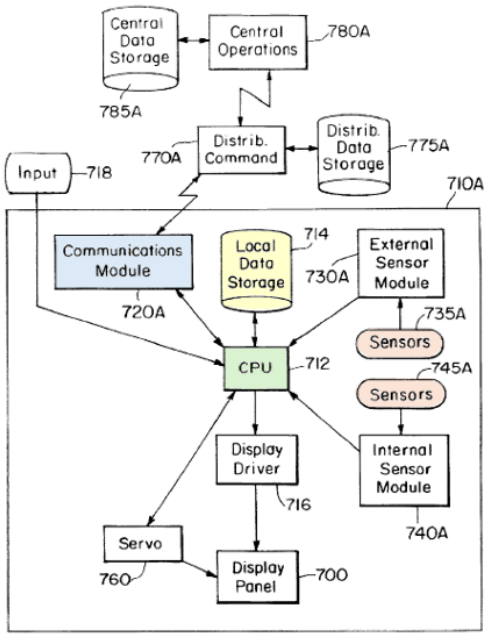


Fig. 37

(Ronzani, Fig. 37 (highlighting added), ¶¶174-178; Cooperstock, ¶114.) A POSITA would have understood that Ronzani's Figure 37 embodiment (which Ronzani discloses for use by firefighters to help with navigation through a burning building) would be well-suited to implementing Levesque's location-based gaming device, since both applications involve continuous tracking of a wearer's position. (Cooperstock, ¶114; Ronzani, ¶176; Levesque, ¶¶25-26, 28, 33.)

The combination would have used a known technique (incorporating hardware into a self-contained head-mounted display) to improve a similar device (Levesque's vehicle-based video gaming device) in the same way. (Cooperstock, ¶115.) Moreover, because the details of implementing a self-contained head-mounted device are not a focus of Levesque, a POSITA, seeking to implement and

adapt Levesque's teachings for a self-contained head-mounted display, naturally would have turned to Ronzani for its complementary applicable teachings and motivations. (*Id.*) Moreover, a POSITA would have had a reasonable expectation of success with the combination. (*Id.*, ¶116.) Ronzani discloses that its head-mounted display "can be adapted for use in many real world situations." (Ronzani, ¶173.) Similarly, Levesque discloses that its basic structure of "display **20**, location sensor **14** and sensors **18**" could enable "nearly an infinite variety of gaming software[.]" (Levesque, ¶43.)

(c) "memory in said head-mounted device storing computer programming capable of execution by said processing circuitry;" (Claim 1[c])

Like claim 1[b], this limitation is obvious over **Levesque** in view of **Ronzani**. (Cooperstock, ¶¶117-119.) Levesque discloses a "**memory … storing computer programming capable of execution by said processing circuitry**." For example, within gaming unit **12**, Levesque discloses that processor **30** is connected to memory **32**, which consists of "any combination of computer readable memory[,]" as shown in Figure 2:

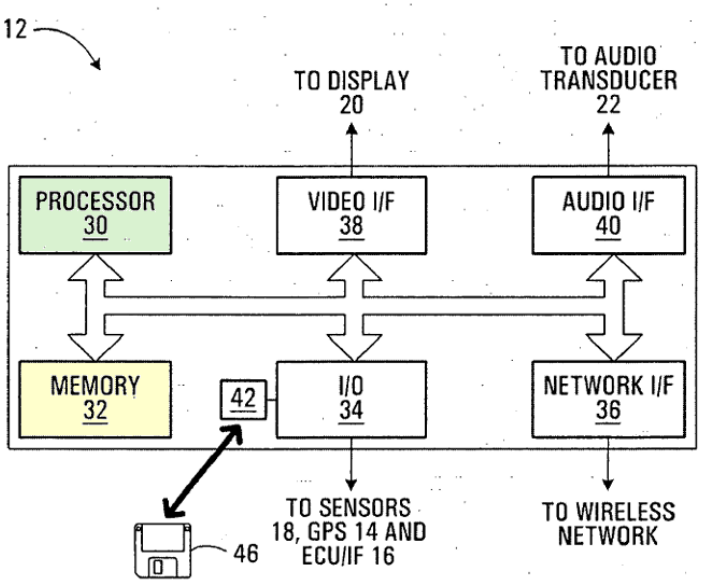


FIG. 2

(Levesque, Fig. 2 (highlighting added), ¶20; Cooperstock, ¶118.) Levesque discloses: "[t]he memory stores gaming software, to present a video game on the heads-up display[.]" (Levesque, ¶9; *see also id.*, ¶10.) Levesque also discloses that game software can be stored on a computer readable medium **46** and read by memory reader **42**, where the medium can be "a CD-ROM, DVD," "ROM cartridge," or other components. (*Id.*, ¶19; *see also id.*, ¶10.) Levesque discloses that games may be "loaded from a computer readable medium," which a POSITA would have understood to involve loading software from computer readable medium **46** to memory **32**. (Cooperstock, ¶118; Levesque, ¶43; *see also id.*, ¶19.)

As discussed above for claim 1[b], it would have been obvious to place the hardware components of Levesque in a head-mounted device in light of **Ronzani**. This would have included placing Levesque's **memory in said head-mounted**

device. (Cooperstock, ¶119.) Ronzani's head-mounted computer **710** includes local data storage **714**.

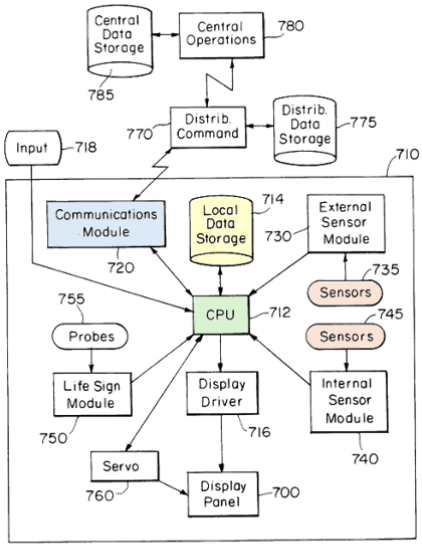


Fig. 35

(Ronzani, ¶162, Fig. 35 (highlighting added); *see also id.*, Figs. 36-45, ¶¶172, 174, 176, 180, 182, 190, 195, 197, 200-201; Cooperstock, ¶119.) Ronzani discloses that local data storage **714** "includes software applications for execution by the CPU **712**." (Ronzani, ¶172; *see also id.*, ¶174.) In light of such disclosures, a POSITA would have been motivated to implement Levesque's video gaming device with a "**memory in said head-mounted device storing computer programming capable of execution by said processing circuitry**," including based on the motivations to combine discussed above (regarding claim 1[b]) for incorporating hardware elements into a self-contained head-mounted device. (Cooperstock, ¶119.)

(d) "a first locating device in said head-mounted device for providing a first control signal for said location based game;" (Claim 1[d])

Like claim 1[b], this limitation is obvious over **Levesque** in view of **Ronzani**. (Cooperstock, ¶¶120-124.) Levesque's discloses "**a first locating device**." (*Id.*, ¶121.) For example, Levesque discloses that heads-up display **20** is connected through video gaming unit **12** to location sensor **14**, as shown in Figure 2:

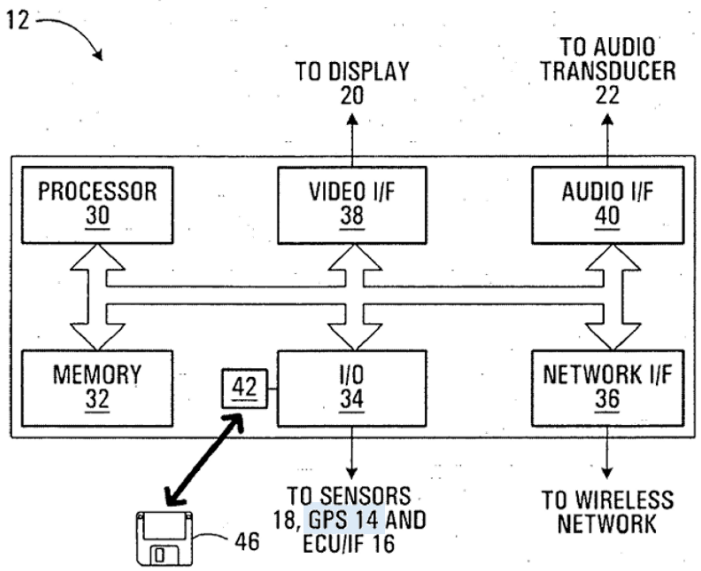


FIG. 2

(Levesque, Fig. 2 (highlighting added), ¶18; Cooperstock, ¶121; *see also* Levesque, Fig. 3, ¶¶32-33.) Levesque discloses that location sensor **14** is "preferably a conventional global positioning system (GPS) satellite receiver[.]" (Levesque, ¶25.) The '243 patent indicates that such a GPS sensor can be a "locating device." (*See* '243, Abstract ("a locating device (e.g., a GPS system)"), 4:5-9, 15:25-27, 3:43-48, 7:6-8, 18:36-42, cl. 4 ("said first locating device comprises a positioning receiver

operable to be utilized in determining a position of said head-mounted device"), cl. 32.)

The location sensor **14** in Levesque's video gaming device is "**for providing a first control signal for said location based game**." (Cooperstock, ¶122.) Levesque discloses that location sensor **14** can "provide[] an indication of sensed geographic location to gaming unit **12**[.]" (Levesque, ¶25.) A POSITA would have understood that a GPS satellite receiver like Levesque discloses would output location information in the form of a digital **signal**. (Cooperstock, ¶122; *see* Levesque, ¶25.) Accordingly, Levesque discloses that location sensor **14** provides information through input/output interface **34**, which contains "suitable ports" including "for connection of … location sensor **14**" consisting of "one or more optical, electrical or wireless ports." (Levesque, ¶23.)

Levesque further discloses using the output signal from location sensor **14** is as a "**control signal for said location based game**." (Cooperstock, ¶123.) Levesque discloses that "[i]nputs controlling play of the video game . . . are provided at least in part by actual operation of the vehicle through … location sensor **14**[.]" (Levesque, ¶32.)

As discussed above for claim 1[b], it would have been obvious to place Levesque's hardware components in a head-mounted device in light of **Ronzani**. This would have included placing Levesque's **first locating device in said head-**

mounted device. (Cooperstock, ¶124.) Ronzani's head-mounted computer **710** includes communication module **720**.

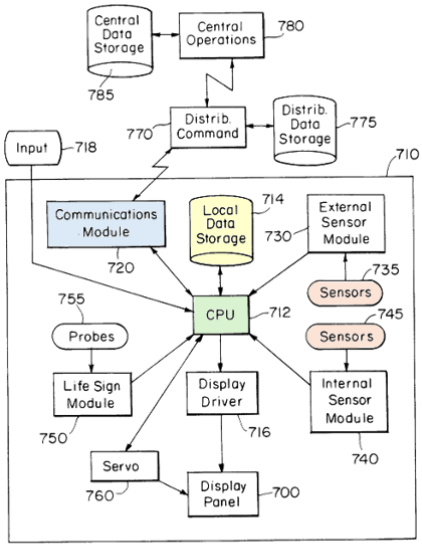


Fig. 35

(Ronzani, ¶165, Fig. 35 (highlighting added); *see also id.*, Figs. 36-45, ¶¶162, 171-172, 175-176, 181, 183, 188, 191, 196, 201; Cooperstock, ¶124.) Ronzani discloses that its communication module "includes a global positioning satellite (GPS) sensor or other position sensor." (Ronzani, ¶176; *see also id.*, ¶¶181, 183, 191, 201.) In light of such disclosures in Ronzani, a POSITA would have been motivated to implement Levesque's video gaming device with "**a first locating device in [the] head-mounted device for providing a first control signal for said location based game**," including based on the motivations to combine discussed above (regarding claim 1[b]) for incorporating hardware elements into a self-contained head-mounted device. (Cooperstock, ¶124.)

(e) "a second locating device in said head-mounted device for providing a second control signal for said location based game; and" (Claim 1[e])

This limitation is disclosed by **Levesque** or obvious in view of **Ronzani**. Levesque's discloses a "**second locating device in said head-mounted device**." (Cooperstock, ¶¶125-28.) For example, Levesque discloses that heads-up display **20** is connected through gaming unit **12** to sensors **18**, including "sensors to sense the position (e.g. tilt and rotation) of the user's head relative to the user's torso." (Levesque, ¶¶26, 34, 42, Figs. 1-3.) Any of these sensors for determining the position of a user's head constitute a **second locating device**.

Example sensors **18** in Levesque's Figure 3 are shown mounted on a user's shoulders:

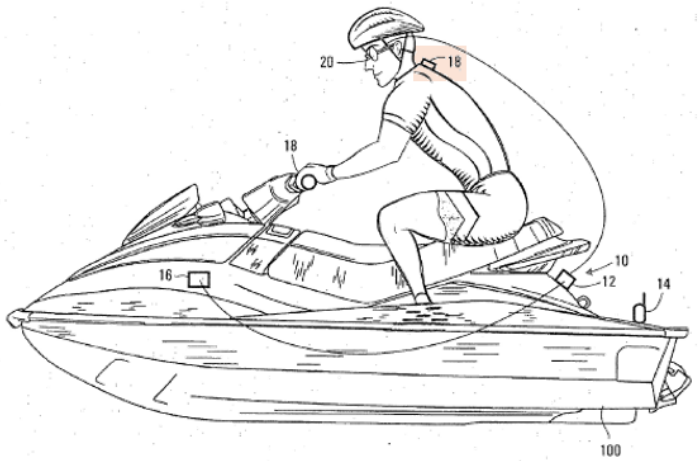


FIG. 3

(Levesque, Fig. 3 (highlighting added); Cooperstock, ¶126.) A POSITA would have

understood that sensors for detecting tilt and rotation of a user's head would be implemented as accelerometers and/or gyroscopes in Levesque's heads-up display **20**. (Cooperstock, ¶126.) The '243 patent indicates that devices for determining acceleration and head tilt or rotation can be a "locating device." ('243 patent, 15:25-27 ("locating devices **701** (e.g., a GPS receiver or an accelerometer)"), 4:15-20 (locating device detect "the direction that the user's head is pointed towards"), 7:15-20, 14:52-15:8, 18:38-42.)

Levesque's sensors **18** are "**for providing a second control signal for said location based game**." (Cooperstock, ¶128.) For example, Levesque discloses that sensors **18** "provide a suitable electronic sensing signal, in analog or digital form, to central gaming unit **12** by way of, for example, input/output interface **34**." (Levesque, ¶26.) The signals from these sensors **18** are used by Levesque's gaming unit **12** as control signals for the location-based game. (*Id.*, ¶32 ("control[] play of the video game").)

To the extent there is any question if Levesque's head tilt and rotation sensors are **in said head-mounted device**, it would have been obvious (as discussed above for claim 1[b]) to place Levesque's hardware components in a head-mounted device in light of **Ronzani**. (Cooperstock, ¶128.) This would have included placing Levesque's **second locating device in said head-mounted device**. Ronzani's head-mounted computer **710** includes external sensors **735** and internal sensors **745**.

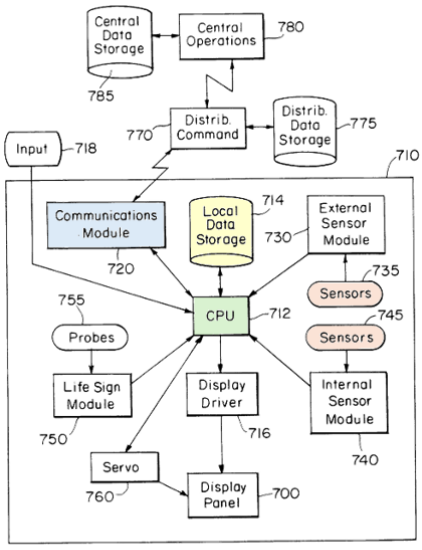


Fig. 35

(Ronzani, ¶¶166-167, Fig. 35; *see also id.*, Figs. 37-45, ¶¶177-178, 181, 184-187, 192-193, 197-198, 202-203; Cooperstock, ¶¶104, 128.) For external sensors **735**, Ronzani discloses that they "provide data representing the external environment around the wearer[,]" including "a position sensor to locate the relative position of an astronaut from a fixed reference data point, such as a landing craft." (*Id.*, ¶¶166, 197.) For internal sensors **745**, Ronzani discloses that they "provide information regarding the wearer's local environment." (*Id.*, ¶167.) In light of such disclosures, a POSITA would have been motivated to implement Levesque's video gaming device with "**a second locating device in said head-mounted device for providing a second control signal for said location based game**," including based on the motivations to combine discussed above (regarding claim 1[b]) for incorporating hardware elements into a self-contained head-mounted device. (Cooperstock, ¶128.)

(f) "a display provided on said head-mounted device, wherein said head-mounted device is a portable device and said processing circuitry is operable to execute said computer programming to cause said display to display said location based game based on a location, direction, and pitch associated, at least in part, with said first control signal and said second control signal, said display of said location based game comprising display of said virtual indicia in a manner that blocks part of, but not all of, said user's view of said real-world environment around said user, and" (Claim 1[f])

Levesque discloses this limitation, or it would have been obvious in light of **Ronzani**. (Cooperstock, ¶¶129-136.) For example, Levesque discloses heads-up display **20**, which Levesque discloses can "take the form of monocular or binocular viewers that may, for example, be in the form of integrated eye glasses, … allowing the user to view an electronically presented image without unduly obstructing the user's view." (Levesque, ¶24.) Levesque also discloses that "heads-up display **20** may form part of a helmet visor." (*Id.*; *see also id.*, ¶¶31, 42, 8-11, 18, 20).

Levesque discloses a "**head-mounted device [that] is a portable device**." (Cooperstock, ¶130.) For example, Levesque describes its system as a "mobile electronic video gaming device." (Levesque, ¶¶18, 30, 2, Title; *see also id.*, ¶6.) Levesque also discloses that its system can be used as a person operates a "moving vehicle." (*Id.*, ¶¶11, 8; *see also id.*, Figs. 1-6, 8, Abstract, ¶¶26, 30-32, 34-36, 39.) A POSITA would have considered Levesque's mobile video gaming system to be a **portable device**. (Cooperstock, ¶130.)

To the extent there is any argument that a "**portable device**" is a device that a person can hold or wear as the person walks around, it would have been obvious to implement Levesque's system as a standalone head-mounted device in light of **Ronzani**, as discussed above for claim 1[b].

Levesque discloses that "**said processing circuitry is operable to execute said computer programming to cause said display to display said location based game based on a location, direction, and pitch associated, at least in part, with said first control signal and said second control signal**." (Cooperstock, ¶¶132-135.) Levesque discloses displaying a game based on **location** using inputs from location sensor **14** (the **first control signal** as discussed above for claim 1(d)). (Cooperstock, ¶133.) Levesque discloses "presenting a video game on a heads-up display; sensing a geographic location of the video gaming device; [and] controlling play of the video game based on the sensed geographic location." (Levesque, ¶11; *see also id.*, ¶¶8, 25, 26.) For example, Levesque discloses that "as the opponents **50** are approached, their size may be magnified on display **20**, much in the same way a user would view actual opponents." (*Id.*, ¶34; *see also* ¶¶25, 40, 41, 42, Figs. 1-3, 6, 8.)

Furthermore, Levesque discloses displaying a game based on **direction** and **pitch** using inputs from sensors **18** (the **second control signal** as discussed above for claim 1(e)). (Cooperstock, ¶134.) For example, Levesque discloses a game in

which "[a]ny motion of the user's head, as sensed by one of external sensors **18** may be taken into account." (Levesque, ¶34; *see also id.*, ¶¶26, 42, 40, Figs. 1-3, 6, 8.)

As discussed above, Levesque discloses that display of a location-based game is provided by **processing circuitry [] operable to execute said computer programming**. (Cooperstock, ¶135.) For example, Levesque discloses that "gaming software exemplary of the embodiments of the present invention processes inputs taken from one or more of location sensor **14** [and] external sensors **18**[.]" (Levesque, ¶28; *see also id.*, ¶¶9, 10, 19.) Further, Levesque discloses that processor **30** causes heads-up display **20** to display games. (*Id.*, ¶20; *see also id.*, cl. 1, cl. 16.)

Levesque discloses "**said display of said location based game comprising display of said virtual indicia in a manner that blocks part of, but not all of, said user's view of said real-world environment around said user**." (Cooperstock, ¶136.) For example, Levesque discloses that "computer generated images displayed by way of display **20** are overlayed on a user's view of the real world[,]" and a user can "view an electronically presented image without unduly obstructing the user's view" of the real world. (Levesque, ¶24; *see also id.*, ¶¶20, 31, 40, Figs. 4, 6, 8.) Such simultaneous viewing of real and virtual imagery is shown in Figure 6 of Levesque, where virtual indicia (including simulated opponent **50**, score **62**, speed, and other text ("2nd place")) block part of, but not all of, the user's view of the real-world environment (*e.g.*, hills and sky). For example, the

speed information in the top left of Figure 6 is shown blocking part of a real-world cloud:

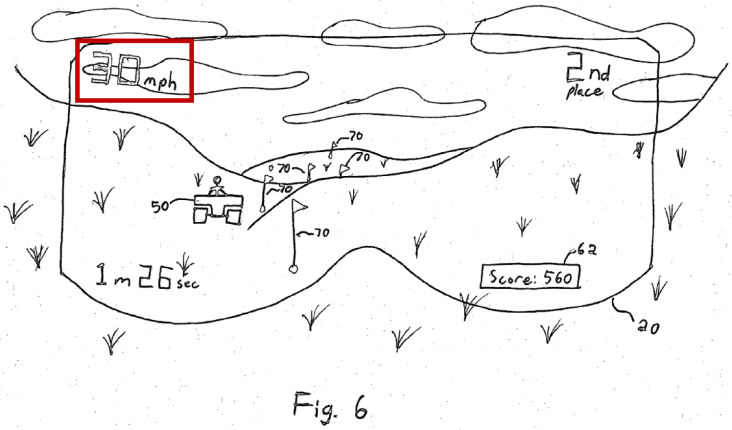


Fig. 6

(*Id.*, Fig. 6 (annotation added), ¶¶34, 39; *see also id.*, Figs. 4, 8; Cooperstock, ¶136.)

(g) "wherein said processing circuitry is operable to execute said computer programming to allow said user of said head-mounted device to manually set one or more boundaries for said location based game." (Claim 1[g])

Levesque discloses this limitation. (Cooperstock, ¶¶137-138.) For example, Levesque discloses that a game can have "a virtual boundary **60**," which is "enforced … to ensure safe game play." (Levesque, ¶35; *see also id.*, ¶¶34, 38, 39, Figs. 4-6, 8.) Levesque discloses that virtual boundary **60** is a **boundar[y] for [the] location based game**. (Cooperstock, ¶137.) For example, Levesque discloses that the gaming unit **12** reacts to a user crossing the boundary, including by "disabl[ing] the game." (Levesque, ¶35.) Further, Levesque discloses a game that "present[s] simulated opponents **50** within a virtual boundary **60**." (*Id.*, ¶34.)

Levesque further discloses "**processing circuitry [] operable to execute said**

computer programming to allow [a] user of [the] head-mounted device to manually set" virtual boundary **60**. (Cooperstock, ¶138.) For example, Levesque discloses providing a "configuration screen" shown in Figure 5 that allows a user to "defin[e]" a virtual boundary **60**:

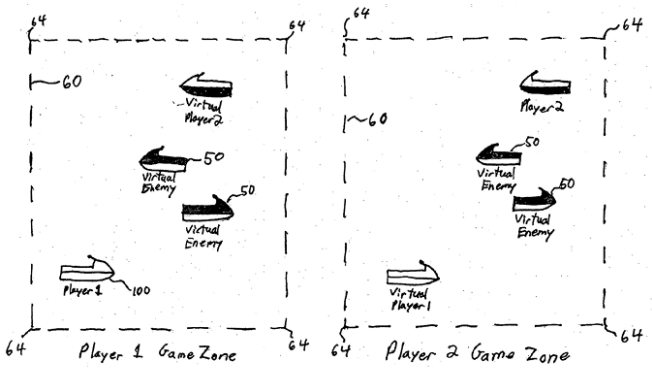


Fig. 5

(Levesque, Fig. 5, ¶35.) The configuration screen allows a user to "travel to the corners **64** of the boundary using vehicle **100** and provid[e] an input by way of one of sensors **18**, for example in the form of a button on the player's uniform or on vehicle **100**." (*Id.*, ¶35, Fig. 5.) Levesque also discloses placing buoys **66** at the corners **64** of the virtual boundaries **60** to define the virtual boundaries. (*Id.*, ¶38, Fig. 4.) Setting boundaries via sensors **18** or placing buoys each constitute a user **manually set[ting]** virtual boundary or boundaries **60**. (Cooperstock, ¶138.) A POSITA would have understood that Levesque's boundary setting user interface would be provided by **processing circuitry**—*i.e.*, processor **30**. (*Id.*) For example, Levesque discloses that a set boundary can be "stored within memory **32** for later

use[,]" which a POSITA would have understood would be performed by processor **30**. (Levesque, ¶¶35, 9-10, 20, Fig. 1; Cooperstock, ¶138.)

2. Claim 6: "The location based game system of claim 1, wherein said location based game is operable to be played on a physical playfield that correlates to a virtual playfield and said processing circuitry is operable to execute said computer programming to set one or more physical boundaries for said physical playfield that correlate to one or more virtual location boundaries of said virtual playfield for said location based game."

Levesque discloses claim 6. (Cooperstock, ¶¶139-149.) For example, Levesque discloses playing a game **on a physical playfield**—*i.e.*, in a real-world environment (*e.g.*, on open water). (Levesque, Figs. 4-6, 8, ¶¶ 8, 9, 11, 20, 24, 34-39, 42.)

Petitioner asserts in litigation that the term "physical" means "real world." (EX1012 at pp.0007-0011.) Levesque satisfies the claim language regardless of whether Petitioner's proposed construction is adopted. (Cooperstock, ¶141.) Levesque discloses playing on a "**physical playfield**" under Petitioner's prior proposed construction because, as discussed above, Levesque discloses playing in a real-world environment. (Levesque, Figs. 4-6, 8, ¶¶34-39, 42; Cooperstock, ¶141.)

Further, Levesque discloses that the **physical playfield [] correlates to a virtual playfield**. (Cooperstock, ¶¶142-143.) For example, Levesque discloses that a user's movements in the real world correlate to movements in the virtual world. Levesque discloses that using inputs from location sensor **14** and other sensors, the

video gaming device can change virtual enemy size, change the virtual elements shown to the viewer, and allow the user to avoid launched weapons. (Levesque, ¶34.) Accordingly, Levesque discloses that its gaming device can provide a game correlating actual and virtual playfields so the user's real-world location can be used to interact with virtual elements. (Cooperstock, ¶142.)

Additionally, Levesque discloses that elements of the virtual environment can correlate to elements on the real-world physical playfield. (Cooperstock, ¶143.) Levesque discloses simulating a game "with reference to a map based on known geography of an area[,]" where "[m]ap information may be correlated to measured location as sensed by location sensor **14**." (Levesque, ¶40.) For example, Levesque discloses providing "[o]bstacles **70** in the form of islands, houses, and the like … with reference to knowledge of the existing topography" of the user's real-world surroundings. (*Id*.)

Levesque discloses that "**said processing circuitry is operable to execute said computer programming to set one or more physical boundaries for said physical playfield that correlate to one or more virtual location boundaries of said virtual playfield for said location based game**." (Cooperstock, ¶144.) For example, Levesque discloses a configuration screen that allows a user to define a boundary **60** at a real-world location. (Levesque, Fig. 5, ¶35.) Boundary **60** shown in Figure 4 of Levesque serves as a physical boundary—*i.e.*, in the real world:

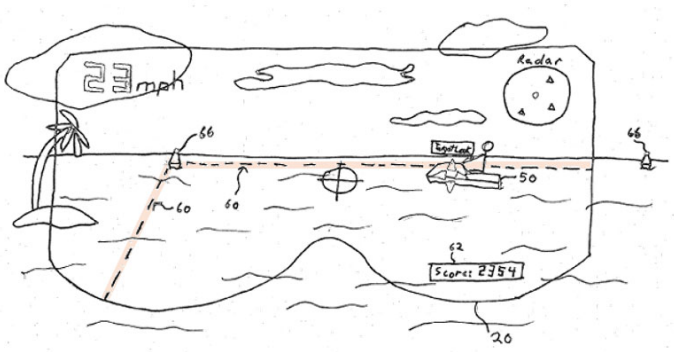


Fig. 4

(Levesque, Fig. 4 (highlighting added); Cooperstock, ¶144.) When a real-world vehicle crosses boundary **60**, "gaming unit **12** may react … by disabling or slowing the vehicle's engine through ECU interface **16** or alternatively sending a necessary warning to the operator by way of display **20** to shut down the vehicle and/or disable the game, thereby maintaining a level of safety." (Levesque, ¶35.) Accordingly, Levesque's system is operable to **set one or more physical boundaries for said physical playfield**—*i.e.*, a boundary in the real world that limits the area where a user can play the game. (Cooperstock, ¶144.)

To the extent there is any argument that a "**physical boundar[y]**" must be a real-world object, Levesque discloses delineating boundary **60** via real-world buoys **66**, which can be physically connected "by way of a rope or string[.]" (Levesque, ¶38.) Accordingly, Levesque's video gaming device **sets one or more physical boundaries for said physical playfield**—*i.e.*, it sets the boundaries delineated by real-world buoys, rope, and/or string—including under Petitioner's litigation

construction that "physical" means "real world." (Cooperstock, ¶¶145-146.) Boundary **60** constitutes a "real world" boundary, as shown in Figure 4 of Levesque, for example. (Levesque, Fig. 4, ¶38.) Furthermore, Levesque discloses that boundary **60** can be delineated by real-world objects like buoys, ropes, and string. (*Id.*)

Levesque further discloses that its physical boundaries "**correlate to one or more virtual location boundaries of said virtual playfield for said location based game**." (Cooperstock, ¶147.) Levesque's boundary **60** serves as a virtual boundary in the virtual environment of a game. (*Id.*) For example, Levesque discloses a game that "present[s] simulated opponents **50** within a virtual boundary **60**." (Levesque, ¶34; *see also id.* ("[M]ovement of the enemies in three-dimensional space, within defined boundaries may be simulated.").) These limitations on the presentation and movement of enemies to virtual boundary **60** show that the "**physical boundaries for said physical playfield**" in Levesque's video gaming device "**correlate to one or more virtual location boundaries of said virtual playfield for said location based game**." (Cooperstock, ¶147.)

Levesque also discloses that multiple real-world players can play together in different real-world areas, and the game will "assimilate[]" their information "and present images representing players outside a current player's zone in that player's heads up display." (Levesque, ¶37.) Levesque discloses that "[i]n this way, the

multiple players may play against each other without occupying the same physical space." (*Id.*) The real-world boundaries of each player's physical playfield "**correlate[s] to one or more virtual location boundaries of said virtual playfield for said location based game**"—*i.e.*, a shared virtual playfield containing all players. (Cooperstock, ¶148.)

Levesque satisfies claim 6 regardless of whether Petitioner's litigation proposed construction for "virtual"—"not real world"—is adopted. (Cooperstock, ¶149.) Levesque's disclosed "virtual location boundaries" and "virtual playfield" are part of a game provided by video gaming device and thus "not real world." (*Id.*)

3. Claim 7: "The location based game system of claim 6, wherein said processing circuitry is operable to execute said computer programming to allow said user of said head-mounted device to manually set dimensions for said physical playfield for said location based game."

Levesque discloses claim 7. (Cooperstock, ¶¶150-151.) For example, as discussed above for claim 1[g], Levesque discloses providing a configuration screen allowing a user to manually set boundary **60** by "travel[ing] to the corners **64** of the boundary using vehicle **100** and providing an input by way of one of sensors **18**, for example in the form of a button on the player's uniform or on vehicle **100**." (Levesque, Fig. 5, ¶35.) Furthermore, Levesque discloses that boundary **60** can be manually set using buoys, rope, or string. (*Id.*, ¶38.) A POSITA would have understood that Levesque's system allows a user to place the buoys, rope, or string.

(Cooperstock, ¶151.) Boundary **60** establishes the "**dimensions for said physical playfield for said location based game**" by determining the real-world boundaries within which the user can play. (Levesque, ¶¶35, 38, 39; Cooperstock, ¶151.)

4. Claim 8: "The location based game system of claim 7, wherein said processing circuitry is operable to execute said computer programming to provide a graphical user interface for display on said display of said head-mounted device to allow said user of said head-mounted device to manually set said dimensions for said physical playfield for said location based game."

Levesque discloses claim 8. (Cooperstock, ¶¶152-153.) For example, as discussed above for claims 1[g] and 7, Levesque discloses providing a configuration screen that allows a user to manually set boundary **60**. (Levesque, Fig. 5, ¶35.) This configuration screen, shown in Figure 5 reproduced below, satisfies the requirements of claim 8.

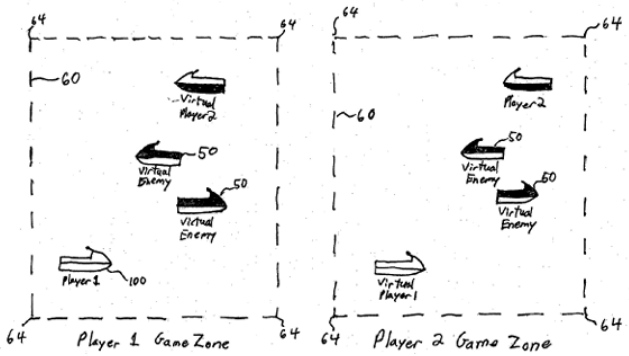


Fig. 5

(Levesque, Fig. 5, ¶35; Cooperstock, ¶153.)

5. Claim 17: "The location based game system of claim 1, wherein said system further comprises a controller operable to communicate with said head-mounted device."

Levesque discloses claim 17, or it is obvious in light of **Ronzani**. (Cooperstock, ¶¶154-161.)

Levesque discloses a "**controller**." (Cooperstock, ¶¶156-157.) For example, Levesque discloses "one of sensors **18** may take the form of a simulated pistol, rifle or the like." (Levesque, ¶41.) This enables a game where "an image such as a target, deer, an opponent, etc." is presented on the side of the road, and a user can engage in "[c]apture, stunning or killing of the target[.]" (*Id.*) Considering such a gun to be a "controller" matches the '243 patent specification, which indicates that a controller "may take the form of a gun." ('243, 19:34-36; *see also id.*, 25:43-45, 28:43-45, 31:49-51, 34:54-56; Cooperstock, ¶155.)

As another example, Levesque discloses that its video gaming device can be connected to sensors **18**, including "one or more button or trigger sensors, connected to suitable buttons/triggers allowing a user to provide deliberate control inputs." (Levesque, ¶¶26, 35.) Figure 3 of Levesque discloses sensors **18** on the handlebars of a personal watercraft:

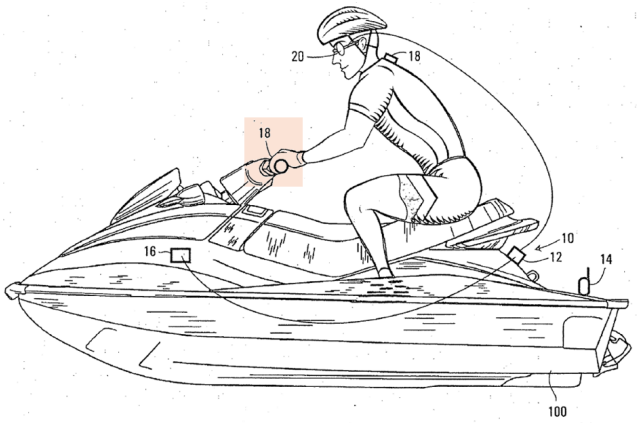


FIG. 3

(*Id.*, Fig. 3 (highlighting added), ¶¶30, 35; Cooperstock, ¶156.) Considering these button or trigger sensors a "**controller**" again matches the '243 patent, which indicates that "controller **1351** may include manual controls **1352**," which "may take the form of manual buttons, such as a trigger." ('243, 19:34-35 (emphasis added); Cooperstock, ¶157.)

Levesque discloses a "**controller operable to communicate with said head-mounted device**." (Cooperstock, ¶158.) For example, Levesque discloses that "sensors provide a suitable electronic sensing signal, in analog or digital form, to central gaming unit **12**[,]" and such signals are "used to control game play." (Levesque, ¶¶26, 32.) The central gaming unit **12** provides the game visuals to heads-up display **20** for display. (Cooperstock, ¶158.) Accordingly, the **controller [is] operable to communicate with said head-mounted device** by controlling gameplay. (Levesque, ¶¶8, 9, 18-19, Figs. 1-2; Cooperstock, ¶158.)

To the extent there is any argument that the claims require a controller to

communicate directly with the head-mounted device, this would have been obvious for Levesque's system in light of **Ronzani**. (Cooperstock, ¶¶159-161.)

As discussed above for claim 1[b], it would have been obvious (in light of Ronzani) to implement Levesque's system as a self-contained head-mounted device. It would have been obvious that a controller would communicate directly with the head-mounted device. (Cooperstock, ¶160.) For example, Levesque indicates that sensors **18** communicate with the processor in Levesque's central gaming unit **12**. (Levesque, ¶19, Fig. 2.) Since Ronzani renders it obvious to place Levesque's processor in a head-mounted device (as discussed above for claim 1[b]), it would naturally follow to connect sensors **18** directly to the processor located in the head-mounted device—*i.e.*, a "**controller operable to communicate with said head-mounted device**." (Cooperstock, ¶160.)

A POSITA would have been further motivated to implement Levesque's system as a standalone head-mounted device with a controller communicating directly with the head-mounted device based on Ronzani's disclosures. (Cooperstock, ¶161.) For example, Ronzani discloses that its head-mounted computer shown in Figure 35 could use an input device **718**, including "a mouse, a joystick, … a track ball, … a virtual reality data glove, … or other suitable input devices." (Ronzani, ¶170; *see also id.*, ¶7.) Ronzani discloses that such input devices **718** would be connected directly to head-mounted computer **710**:

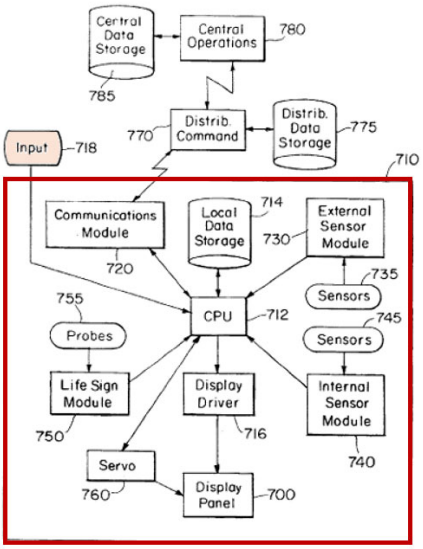


Fig. 35

(*Id.*, Fig. 35 (highlighting and annotations added), ¶¶170, 164; Cooperstock, ¶161; *see also* Ronzani, Figs. 36-45.) Ronzani's example input devices **718** are similar to the example "controllers" disclosed in the specification of the '243 patent. ('243, 13:8-12 ("controller such as an instruction glove or control buttons"), 19:44-47; Cooperstock, ¶161.)

6. Claim 24: "The location based game system of claim 1, wherein said head-mounted device further comprises a communications device operable to communicate with a remote server."

Levesque with **Ronzani** discloses and renders obvious claim 24. (Cooperstock, ¶¶162-164.) For example, Levesque discloses gaming unit **12** containing a network interface **36**:

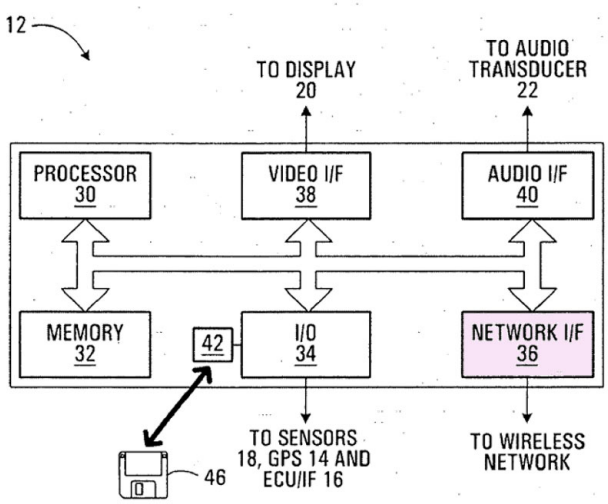


FIG. 2

(Levesque, Fig. 2 (highlighting added), ¶22; Cooperstock, ¶163.) Levesque discloses that network interface **36** "may allow communication of gaming unit **12** with a server[.]" (Levesque, ¶22.) Furthermore, network interface **36** can "communicate[] wirelessly … to a centralized network site," which a POSITA would have understood to involve communicating with a server. (*Id.*, ¶39; Cooperstock, ¶163.)[1] A POSITA would have understood that network interface **36** would communicate with a **remote server**. (Cooperstock, ¶163.) Levesque discloses using its system in outdoor environments like on open water, so a POSITA

[1] Paragraph 39 of Levesque appears to contain a typo—referencing "network interface **34**," when the rest of Levesque's specification refers to "network interface **36**." (Levesque, Fig. 2, ¶¶19, 22, 37, 38, 42; Cooperstock, ¶163.) A POSITA would have recognized that this was a typo and understood paragraph 39 of Levesque to refer to network interface **36**. (Cooperstock, ¶163.)

would have understood that any server would need to be located remotely from the system. (*Id.*)

It would have been obvious to locate network interface **36** within the head-mounted part of Levesque's system in light of **Ronzani**, as discussed above for claim 1[b]. In addition to the motivations to combine discussed above, a POSITA would have been motivated to incorporate Levesque's communications device into the head-mounted device based on, for example, Ronzani's disclosure of communication module **720** in its head-mounted computer, as shown below in Ronzani's Figure 35.

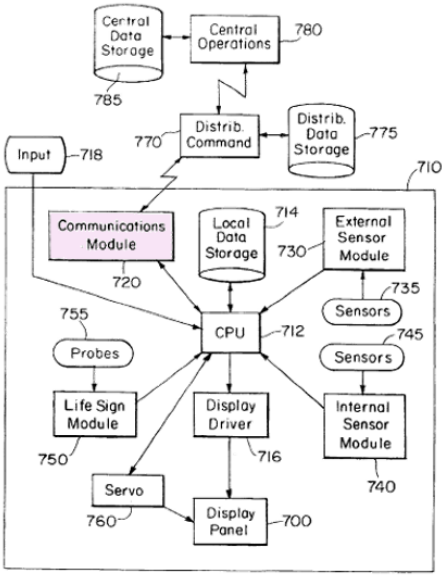


Fig. 35

(Ronzani, Fig. 35 (highlighting added), ¶165; Cooperstock, ¶164.) Ronzani discloses that communication module **720** "includes a wireless transducer for transmitting and receiving digital audio, video and data signals," including in

communication with a "distributed command computer **770**[.]" (Ronzani, ¶¶165, 171; *see also id.*, ¶¶172, 175, 181, 183, 188, 191, 196, 201, Figs. 36-45.)

7. Claim 25: "The location based game system of claim 24, wherein said location based game is a multiplayer game and said communications device of said head-mounted device is operable to communicate with said remote server in order to enable said multiplayer game."

Levesque discloses claim 25. (Cooperstock, ¶¶165-167.) Levesque discloses a "**location based game [that] is a multiplayer game**[.]" (*Id.*, ¶166.) Levesque discloses that "multiple players may play against each other[.]" (Levesque, ¶37; *see also id.*, ¶¶24, 39, 40.) A multiplayer game is shown in Figure 5 of Levesque, where information regarding two players (player 1 and player 2) is combined so that each appears as a character in the other player's game:

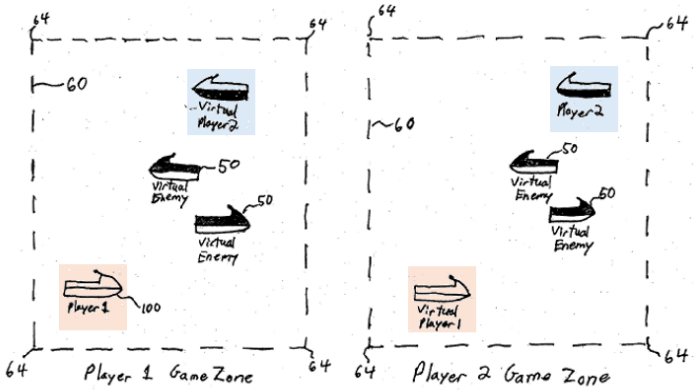


Fig. 5

(*Id.*, Fig. 5 (highlighting added), ¶¶35, 37; Cooperstock, ¶166.)

Levesque discloses that "**said communications device of said head-mounted device is operable to communicate with said remote server in order to**

enable said multiplayer game." (Cooperstock, ¶167.) Levesque discloses that multiplayer game functionality uses communication over a wireless network. For example, Levesque discloses that "[i]nformation about the players may be shared between multiple gaming devices **10** (as for example by way of network interface **36**)[.]" (Levesque, ¶37; *see also id.*, ¶39.) POSITA would have understood that typically, such information exchange between video gaming devices would be mediated by a remote server, and communication would occur between each gaming device and the **remote server**. (Cooperstock, ¶167.) Indeed, Levesque discloses that "network interface **36** may allow communication of gaming unit **12** with a server …, either by way of data or voice." (*Id.*, ¶22 (emphasis added); *see also id.*, ¶39.)

8. Claim 26: "The location based game system of claim 25, wherein said communications device of said head-mounted device is operable to communicate location information regarding said head-mounted device to said remote server."

Levesque discloses claim 26. (Cooperstock, ¶¶168-171.) As discussed above for claim 1, Levesque discloses using real-world location as a control input for a game. (*See, e.g.*, Levesque, ¶¶8, 33, 25, 9, 34.) For multiplayer games, Levesque discloses that players can be in different real-world areas and "information about multiple players each playing within his/her own non-overlapping virtual boundaries **60** may be assimilated." (*Id.*, ¶37.) To facilitate this assimilation process, Levesque discloses sharing information over a "**communications device**"—*i.e.*, network

interface **36**. Levesque discloses that "[i]nformation about the players may be shared between multiple gaming devices **10** (as for example by way of network interface **36**) and each gaming device **10** may superimpose the multiple game zones, and present images representing players outside a current player's zone in that player's heads up display." (*Id.*; *see also id.*, ¶¶39, 40.)

A POSITA would have understood that the information shared between Levesque's gaming devices would include "**location information regarding [each] head-mounted device**." (Cooperstock, ¶170.) For example, Levesque's Figure 5 shows that player 1's location in his or her game zone is used to present a "virtual player 1" in the game zone of player 2, and vice versa. This indicates that player 1's location information has been communicated via network interface **36**, and so has player 2's location information:

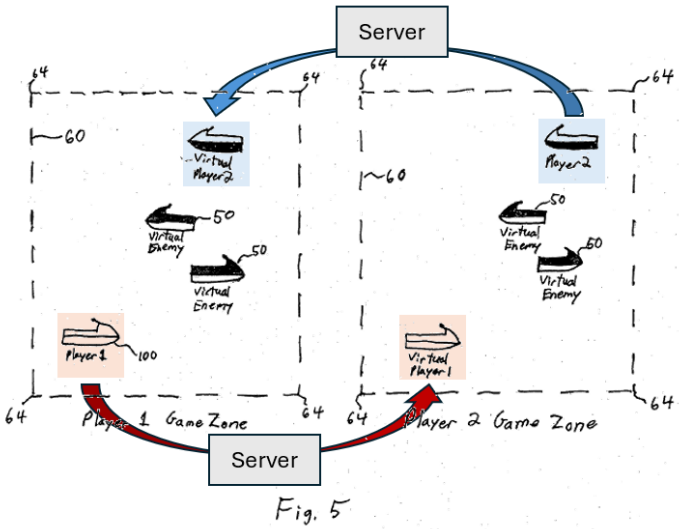


Fig. 5

(Levesque, Fig. 5 (annotations added), ¶37; Cooperstock, ¶170; *see also* Levesque,

¶40.)

As discussed above for claim 25, a POSITA would have understood that typically, such information exchange between video gaming devices would be mediated by a remote server, and communication would occur between each gaming device and the server, as shown in the above diagram. (Cooperstock, ¶171.) Levesque discloses that "network interface **36** may allow communication of gaming unit **12** with a server …, either by way of data or voice." (Levesque, ¶22 (emphasis added).) Accordingly, Levesque discloses that **said communications device of said head-mounted device** (*e.g.*, network interface **36**) is **operable to communicate location information** (*e.g.*, player 1/2 location information) **regarding said head-mounted device to said remote server**. (Cooperstock, ¶¶168-171.)

9. Claim 27: "The location based game system of claim 26, wherein said communications device of said head-mounted device is operable to receive location information regarding a device of another player in said multiplayer game from said remote server."

Levesque discloses claim 27. (Cooperstock, ¶¶172-175.) As discussed above for claim 26, Levesque discloses communicating device location information for over network interface **36** to enable multiplayer gaming. (*See, e.g.*, Levesque, ¶¶37, 39, 40, 42, 22, Fig. 5.) As part of this process, Levesque discloses that each video gaming device "**is operable to receive location information regarding a device of another player in said multiplayer game from said remote server**." For example,

Levesque discloses that "[i]nformation about the players may be shared between multiple gaming devices **10** (as for example by way of network interface **36**) and each gaming device **10** may superimpose the multiple game zones, and present images representing players outside a current player's zone in that player's heads up display." (*Id.*, ¶37.) Levesque's Figure 5 demonstrates.

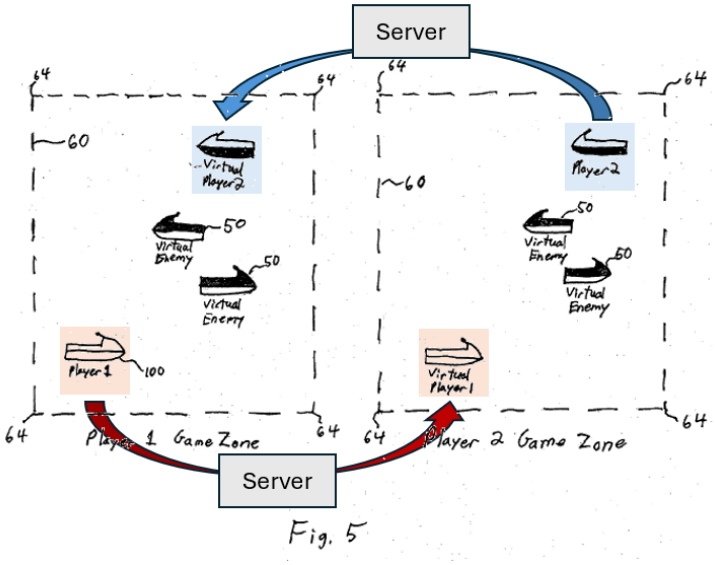


Fig. 5

(Levesque, Fig. 5 (annotations added), ¶¶37, 22, 40; Cooperstock, ¶174.)

As discussed above, a POSITA would have understood that such exchange of location information between devices would have typically been mediated by a remote server, so each device would "**receive location information regarding a device of another player in said multiplayer game from said remote serve**r," as shown in the diagram above. (Cooperstock, ¶175.) Levesque discloses that "network interface **36** may allow communication of gaming unit **12** with a server …, either by way of data or voice." (Levesque, ¶22 (emphasis added); *see also id.*,

¶39.)

10. Claim 28: "The location based game system of claim 25, wherein said head-mounted device is operable to allow said user of said head-mounted device to talk to another player during said multiplayer game."

Levesque discloses claim 28. (Cooperstock, ¶¶176-177.) Levesque discloses enabling multiplayer game players to talk to each other while playing the game "to facilitate play between multiple players, voice data may be exchanged between players by way of network interface **36**, or otherwise." (Levesque, ¶¶37, 22; *see also id.*, ¶¶24, 40.)

11. Claim 30: "The location based game system of claim 1, wherein:" (Claim 30[pre])

As discussed above, **Levesque** in light of **Ronzani** discloses and renders obvious the preamble of claim 30. (Cooperstock, ¶178.)

(a) "said location based game is operable to be played on a physical playfield that correlates to a virtual playfield;" (Claim 30[a])

As discussed above for claim 6, Levesque discloses claim 30[a]. (Cooperstock, ¶179.)

(b) "said location based game comprises said virtual game character and said virtual game character is computer controlled;" (Claim 30[b])

Levesque discloses claim 30[b]. (Cooperstock, ¶¶180-181.) As discussed for claim 1[a], Levesque discloses location-based games with "**virtual game**

character[s]," including "simulated opponents **50**[.]" (Levesque, ¶34; Cooperstock, ¶181; *see also* Levesque, ¶40, Figs. 4-6.) These simulated opponents **50** are "**computer controlled**." (Cooperstock, ¶181.) Levesque discloses that "movement of the enemies in three-dimensional space, within defined boundaries may be simulated." (Levesque, ¶34; *see also id.* ("simulated" weapon fire).) A POSITA would have understood that the "simulated" behavior of opponents **50** is controlled by the gaming software running on processor **30**. (*Id.*, ¶¶20 (processor "present[s] a near real-time gaming environment"), 9, 34; Cooperstock, ¶181.) Accordingly, a POSITA would have understood that simulated opponents **50** are "**computer controlled**." (Cooperstock, ¶181.)

(c) "said location based game comprises a second virtual game character and said second virtual game character is user controlled; and" (Claim 30[c])

Levesque discloses claim 30[c]. (Cooperstock, ¶¶182-185.) For example, Levesque discloses that a user controls his or her *own* "**second virtual game character**" in the game. For example, Figure 5 shows an example "configuration screen" for a game. (Levesque, ¶35.) This configuration screen represents player 1's position in the form of item **100**—*i.e.*, a **virtual game character** that is **user controlled** (*e.g.*, based on the user's real-world location):

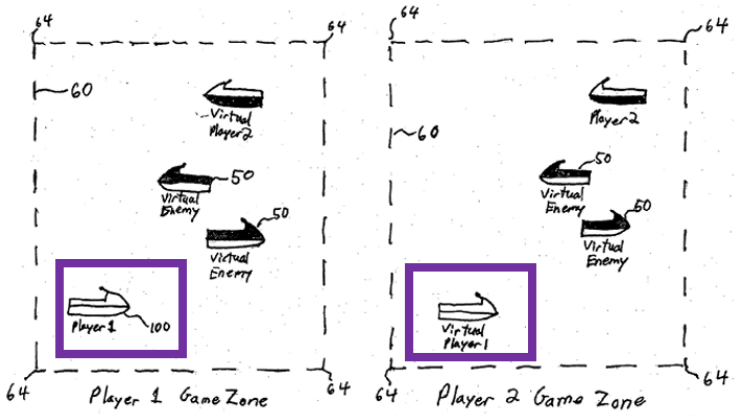


Fig. 5

(*Id.*, Fig. 5 (annotations added), ¶35; Cooperstock, ¶183.)

Levesque also discloses that a user's real-world actions control the actions of a virtual character in the game. (Cooperstock, ¶184.) For example, Levesque discloses that "[i]nputs received by way of external sensors **18** and location sensor **14** allows gaming device **10** to simulate interaction with these virtual opponents **50**"—*i.e.*, interaction via a virtual game character representing the user in the game. (Levesque, ¶34; Cooperstock, ¶184.) Further, Levesque discloses that a user views the virtual game world via the perspective of an in-game character. For example, Levesque discloses that "as the opponents **50** are approached, their size may be magnified on display **20**, much in the same way a user would view actual opponents." (Levesque, ¶34.) Similarly, the in-game character perspective varies with the motion of a user's head. (*Id.*)

As another example of **"a second virtual game character**" that is **"user**

controlled," Levesque discloses that a game can show virtual characters controlled by *other* users. (Cooperstock, ¶185.) Levesque discloses receiving information about other players using network interface **36** and "present[ing] images representing players outside a current player's zone in that player's heads up display." (Levesque, ¶37.) Figure 5 shows the user controlled characters alongside simulated opponents **50**:

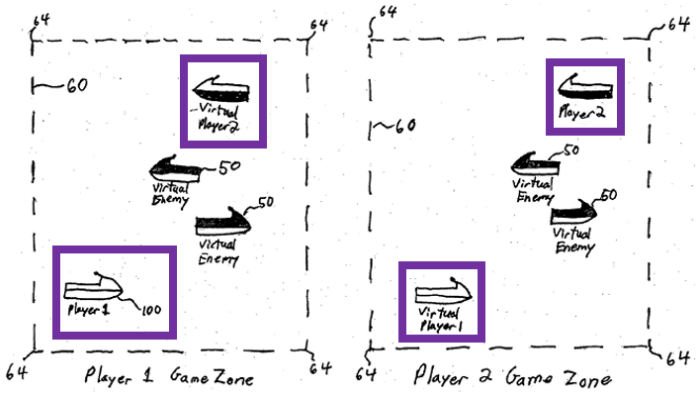


Fig. 5

(*Id.*, Fig. 5 (annotations added), ¶¶35, 37; Cooperstock, ¶185.)

(d) "said processing circuitry is operable to execute said computer programming to cause said user of said head-mounted device to lose control of said second virtual game character when said user travels through a location on a physical playfield correlating to a virtual boundary of said virtual playfield, and to regain said control of said second virtual game character when said user returns to said location on said physical playfield." (Claim 30[d])

Levesque discloses this limitation. (Cooperstock, ¶¶186-188.) For example, Levesque discloses that when a user crosses boundary **60**, the video gaming device

causes the user to **lose control of [the] second virtual game character**. Levesque discloses that when boundary **60** is crossed, gaming unit **12** may react by "disabling or slowing the vehicle's engine through ECU interface **16** or alternatively sending a necessary warning to the operator by way of display **20** to shut down the vehicle and/or disable the game. (Levesque, ¶35.) Since Levesque indicates that a user controls the **second virtual game character** by controlling a vehicle, Levesque's disclosure of "disabling or slowing the vehicle's engine" constitutes "**los[ing] control of said second virtual game character**." (Cooperstock, ¶186.) Furthermore, since Levesque discloses this as a reaction to an operator "crossing the defined virtual boundary **60** (as sensed through location sensor **14**)," Levesque discloses that the loss of control takes place "**when said user travels through a location on a physical playfield correlating to a virtual boundary of said virtual playfield**[.]" (Levesque, ¶35; Cooperstock, ¶186.)

A POSITA would have further understood that Levesque's system would allow a user to "**regain said control of said second virtual game character when said user returns to said location on said physical playfield**." (Cooperstock, ¶187.) Levesque discloses playing games within boundary **60**. (Levesque, ¶¶34 (game is presented "within a virtual boundary **60**"), 35, 38, Fig. 5.) Accordingly, a POSITA would have understood that when a user returns to a position within boundary **60** (*e.g.*, the location where that user crossed boundary **60**), the user would

regain control over the vehicle and the game. (Cooperstock, ¶187.)

A POSITA would have understood that "**said processing circuitry is operable to execute said computer programming**" to perform loss and regaining of control for Levesque's system. (Cooperstock, ¶188.) For example, Levesque discloses that the location sensor is "in communication with the processor to provide data indicative of the geographic location to the processor[.]" (Levesque, ¶9; *see also id.*, ¶10.) Accordingly, a POSITA would understand that processor **30** would implement the game control functionality related to boundary **60** using location sensor **14**. (*Id.*, ¶35; Cooperstock, ¶188.) Furthermore, Levesque discloses that the processor **30** of a video gaming device communicates with ECU interface **16** to receive inputs and control operation of the vehicle. (Levesque, Figs. 1-2.)

B. Ground 2: Claims 9, 10, and 22 Are Obvious Over Ground 1 Prior Art in Further View of Fager

1. Claim 9: "The location based game system of claim 6, wherein said processing circuitry is operable to execute said computer programming to:" (Claim 9[pre])

As discussed above (*e.g.*, for claim 1[b]), Levesque discloses the preamble, to the extent it is a limitation. (Cooperstock, ¶189.)

(a) "provide default dimensions for said physical playfield for said location based game; and" (Claim 9[a])

Levesque with **Fager** discloses and renders obvious this limitation. (Cooperstock, ¶¶190-202.) As discussed above for claims 1[g] and 6, Levesque

discloses user-configurable boundaries for physical playfield dimensions, including in a multiplayer game where users are located in different places in the real world. (Levesque, Fig. 5, ¶35.) Fager similarly discloses a location-based game where a user can play a tennis video game against another player in a different location. (Fager, Fig. 5, ¶¶77-95; Cooperstock, ¶191.) Fager further discloses details for setting a common play area for the multiple players. (Cooperstock, ¶191.)

Fager discloses a "means for establishing a smallest common court" for the players of the tennis game. (Fager, ¶88; Cooperstock, ¶¶191, 77-82.) A device for "obtaining information about an environment" to each user implements an algorithm to set a "court in common, starting from a minimal starting environment." (Cooperstock, ¶191) The device uses an algorithm that "increases the area gradually and compares which stationary objects that are found in each step of increasing the area." (Fager, ¶88) "When an obstacle is found in some of the environments," Fager discloses determining if a corresponding obstacle exists in the other user's environment. (*Id.*) Then, "if the obstacles have very similar properties," the obstacle can be included in the shared gameplay area—but otherwise "the iteration is stopped in the directions which the obstacles define." (*Id.*) "[T]he algorithm is repeated until no way to increase the area remains." (*Id.*) A player may "adjust different properties" of the virtual tennis court. (*Id.*, ¶93 (adjusting properties of "the fictitious lines **25** on the fictitious tennis court").)

In light of Fager's disclosures, it would have been obvious to implement Levesque's system (including as combined with Ronzani) to set virtual boundaries for a location-based game using the physical surroundings of a user or users. (Cooperstock, ¶192.) It would have been obvious to use these initially set virtual boundaries as **default dimensions for said physical playfield** and allowing a user to adjust the dimensions. (*Id.*) For example, it would have been obvious to allow a user to manually set dimensions for the physical playfield *instead* of using the default dimensions—*e.g.*, if the default dimensions are not satisfactory to a user. (*Id.*) It would also have been obvious to have Levesque's "**processing circuitry [] operable to execute said computer programming**" manage the default dimensions functionality, since the processing circuitry manages boundary setting functionality in Levesque's system, as discussed above for claims 1[g] and 6.

Rationale and Motivation to Combine (Levesque, Ronzani, and Fager): It would have been obvious to combine Fager's teachings regarding setting default dimensions of a physical playfield with Levesque (and under the proposed combination with Ronzani). (Cooperstock, ¶¶194-202.) The combination would have involved the straightforward incorporation of Fager's environmental scanning functionality into Levesque's system (as implemented as a standalone system in light of Ronzani) for providing default dimensions of a location-based game. (*Id.*, ¶194.) The combination discloses and renders obvious "**provid[ing] default dimensions**

for said physical playfield for said location based game." (*Id.*)

Levesque, Ronzani, and Fager are all analogous references to the '243 patent. (Cooperstock, ¶195.) As discussed above for claim 1[b], Levesque and Ronzani are analogous references to the '243 patent. Further, like the '243 patent, Fager is in the field of portable user-worn devices for providing location-based entertainment. ('243, 2:28-51, 1:22-23; Fager, ¶¶1 ("Field of the Invention" describing "real environment and at least one fictitious phenomenon" and tracking "position and/or orientation"), 77 (user "carries on the head **10** a means in the form of a so-called headset **13**"); *see also id.*, ¶¶78-95, Figs. 1, 4, 5.) Levesque, Ronzani, and Fager would have also been reasonably pertinent to problems facing the '243 patent inventor, including implementation of a multiplayer location-based game. (Cooperstock, ¶195.)

A POSITA would have been motivated to combine Levesque (in combination with Ronzani) and Fager including based on similarities between their disclosed location-based games. (Cooperstock, ¶196.) For example, both Levesque and Fager disclose providing a multiplayer location-based game played by users in different environments where the opponent player is displayed. (Levesque, ¶37, Fig. 5; Fager, ¶¶77, 87-88.) Thus, a POSITA would have considered the combination to be a straightforward application of a technique disclosed by Fager for a similar system disclosed by Levesque. (Cooperstock, ¶196.)

A POSITA would have been motivated to combine Levesque (in combination with Ronzani) and Fager to allow for more types of location-based games on Levesque's system (particularly as implemented as a standalone head-mounted device in light of Ronzani). (Cooperstock, ¶197.) Levesque discloses "nearly an infinite variety of gaming software taking advantage of one or more of display **20**, location sensor **14** and sensors **18** may be possible," which would have motivated a POSITA to look for further games to implement. (Levesque, ¶43; Cooperstock, ¶197.) A POSITA would have understood that Fager's environmental scanning would have enabled Levesque's video gaming device to be used for more games, including Fager's tennis game. (Cooperstock, ¶197; Fager, ¶88.) Furthermore, Levesque discusses use of video games with "sports and exercise activity." (Levesque, ¶6.) Thus, a POSITA would have been particularly motivated to look to Fager's disclosure of a sports location-based game—*i.e.*, tennis. (Cooperstock, ¶197.)

It would have been obvious for Levesque to provide default dimensions for the physical playfield. As discussed above for claim 6, Levesque's physical playfield is defined by boundary **60**. (Levesque, Fig. 5, ¶35.) Levesque describes a default *shape* (*i.e.*, rectangle) for boundary **60**. (*Id.*, ¶35.) It would have been obvious and straightforward to provide default *dimensions* for boundary **60** as well. (Cooperstock, ¶198.)

For example, a POSITA would have been motivated to provide default dimensions for Levesque's boundary **60** to save users' time. (Cooperstock, ¶199.) Levesque describes a user manually inputting dimensions for boundary **60** by moving around the real world. (Levesque, ¶35.) A POSITA would understand that it would be advantageous not to require a user to perform this manual configuration process every time the user plays a game. (Cooperstock, ¶199.) Instead, a POSITA would have recognized that Levesque's system could suggest default dimensions for boundary **60**, which a user could accept if satisfied with the dimensions—sparing the user from having to engage in much of the manual configuration process for boundary **60**. (*Id.*) A POSITA would have been motivated to save the user's time based on, for example, Levesque's disclosure that a rectangular boundary **60** is preferable, because it only requires a user to input "opposed corners **64**." (Levesque, ¶35.) A POSITA would have understood based on this disclosure that minimizing the amount of user time necessary for boundary **60** configuration is advantageous. (Cooperstock, ¶199.)

Further, a POSITA would have been motivated to implement Levesque's system with default playfield dimensions to increase safety and user enjoyment. (Cooperstock, ¶200.) A POSITA would have implemented Levesque's system to provide default dimensions for boundary **60** to inform a user generally how much space a particular location-based game requires—both to improve safety and

enjoyment of the game. (*Id.*) A POSITA would have understood such suggested dimensions to be particularly necessary given the numerous games Levesque discloses. (Levesque, ¶¶43 (describing "nearly an infinite variety of gaming software"), 34, Figs. 4-8, ¶¶ 35-42; Cooperstock, ¶200.) A POSITA would have been motivated to improve safety based on Levesque's disclosure that boundary **60** is used "to ensure safe game play." (Levesque, ¶35; Cooperstock, ¶200.) Additionally, POSITA would have been motivated to improve enjoyment of Levesque's games, which combine "enjoyment derived from operation of the vehicle with enjoyment derived from the game." (Levesque, ¶¶6-8; Cooperstock, ¶200.)

The combination would have used a known technique (scanning a user's environment to determine default playfield dimensions) to improve a similar device (Levesque's video gaming device) in the same way. (Cooperstock, ¶202.) Furthermore, a POSITA would have had a reasonable expectation that the combination would have been successful. (*Id.*) Levesque discloses that its structure of "display **20**, location sensor **14** and sensors **18**" could make possible "nearly an infinite variety of gaming software." (Levesque, ¶43.) Similarly, Fager discloses that its embodiments "may be used for several purposes," including "the entertainment branch of industry, education, simulation and driving of vehicles[.]" (Fager, ¶2.)

(b) "allow said user of said head-mounted device to change said default dimensions." (Claim 9[b])

Levesque with **Fager** discloses and renders obvious this limitation. (Cooperstock, ¶¶203-206.) As discussed above for claim 9[a], it would have been obvious to implement Levesque's system such that once default playfield dimensions were determined based on Fager's disclosures, a user could change the playfield dimensions to set his or her own preferred playfield dimensions. (*E.g.*, Levesque, Fig. 5, ¶35; Cooperstock, ¶204.) Accordingly, it would have been obvious to "**allow said user of said head-mounted device to change said default dimensions**. (Cooperstock, ¶204.)

Additionally, it would have been obvious based on Fager's disclosures to **change [the physical playfield's] default dimensions** whenever a user changes his or her real-world environment. (Cooperstock, ¶205.) For example, Fager's playfield dimensions are determined by "obtaining information about an environment" for each player. (Fager, ¶88.) Thus, a POSITA would have understood that such default dimensions would be changed whenever either player changes environments. (*Id.*, ¶88; *see also id.*, ¶87 ("The game may take place in adjacent rooms as well as more distant rooms."); Cooperstock, ¶205.) It would have been obvious to implement Levesque's system to provide the user new default playfield dimensions whenever a user changes their real-world environment. (Cooperstock, ¶205.) Such an implementation would be managed through Levesque's boundary **60** configuration

screen, allowing a user to set different boundaries than the suggested defaults. (Cooperstock, ¶205.) The '243 patent specification indicates that such functionality constitutes **changing default dimensions**. ('243, 6:34-40 (disclosing that to change default dimensions "a game may be PAUSED, taken to a different physical, playfield, and the physical playfield dimensions may be changed before the game is RESTARTED") (emphasis added).)

2. Claim 10: "The location based game system of claim 9, wherein said processing circuitry is operable to execute said computer programming to provide a graphical user interface for display on said display of said head-mounted device to allow said user of said head-mounted device to change said default dimensions for said physical playfield for said location based game."

Levesque with **Fager** discloses and renders obvious claim 10. (Cooperstock, ¶¶207-209.) For example, as discussed above for claim 9, it would have been obvious to implement Levesque's video gaming device based on Fager to scan a user's environment and determine default dimensions for the playfield based on that scan. (Cooperstock, ¶208.) A user could then change the dimensions through a configuration screen like the one Levesque discloses for its Figure 5 embodiment. (Levesque, ¶35, Fig. 5; Cooperstock, ¶208.)

Additionally, as discussed above for claim 9, it would have been obvious to implement Levesque's video gaming device based on Fager such that each time a user changes his or her environment, the system provides the user with new default

dimensions (which the user can manage through a configuration screen). (Levesque, ¶35, Fig. 5; Cooperstock, ¶209.)

3. Claim 22: "The location based game system of claim 17, wherein said controller comprises at least one directional device for providing a control signal associated with a direction and/or a pitch of said controller for said location based game."

Levesque discloses and renders obvious claim 22, or it would have been obvious in light of **Fager**. (Cooperstock, ¶¶210-219.) As discussed above for claim 17, Levesque discloses a "**controller**"—*i.e.*, "one of sensors **18**" in the form of "a simulated pistol, rifle or the like." (Levesque, ¶41.) Levesque discloses that such a controller enables a game where "an image such as a target, deer, an opponent, etc." is presented on the side of the road, and a user can engage in "[c]apture, stunning or killing of the target[.]" (*Id.*)

Based on Levesque's disclosures, a POSITA would have been motivated to implement a simulated gun controller containing sensors that provide a control signal based on the controller's direction and pitch. (Cooperstock, ¶213.) For example, a POSITA would have understood that Levesque's simulated gun controller could be implemented with accelerometers and gyroscopes to determine the direction and pitch of the controller. (*Id.*)

For example, a POSITA would have been motivated to implement Levesque's simulated gun controller to operate like a real gun, where the direction and pitch of

the gun determines where it shoots. (Cooperstock, ¶214.) A POSITA would have been motivated to implement such a controller to maximize realism. (*Id.*) Indeed, Levesque indicates that the example game using a simulated gun controller could provide a "realistic" experience. (Levesque, ¶41 (emphasis added).) Levesque also discloses that one limitation with the prior art is that "sports and exercise activity is often constrained to accommodate use of the video game." (*Id.*, ¶6.) To avoid such a limitation, a POSITA would have sought to provide a more accurate version of the sport of shooting or hunting. (Cooperstock, ¶214.)

Furthermore, a POSITA would have been motivated to implement Levesque's simulated gun controller to provide a signal based on direction and pitch of the controller to increase entertainment value. (Cooperstock, ¶215.) Levesque discloses that "[s]ensor inputs may allow the deployment of simulated weapons to destroy the virtual opponents **50**." (Levesque, ¶0034.) A POSITA would have been motivated to allow a user to realistically aim a simulated weapon controller to destroy virtual opponents. (Cooperstock, ¶215.) A POSITA would have understood that a simulated gun controller with realistic aiming functionality would be more entertaining for a user than a gun controller that did not allow for control by aiming. (Cooperstock, ¶215.) A POSITA would have been motivated to implement a more entertaining system, including based on Levesque's disclosure that prior art systems "have served more as a motivational tool than as a form of entertainment."

(Levesque, ¶6; Cooperstock, ¶215.)

To the extent there is any question whether claim 22 would have been obvious based on Levesque alone, it would have been obvious based on Levesque (in combination with Ronzani) in light of **Fager**. (Cooperstock, ¶¶216-219.) For example, Fager discloses a tennis simulation game using a component **26** designed to feel like a tennis racket that provides a control signal based on its direction and pitch:

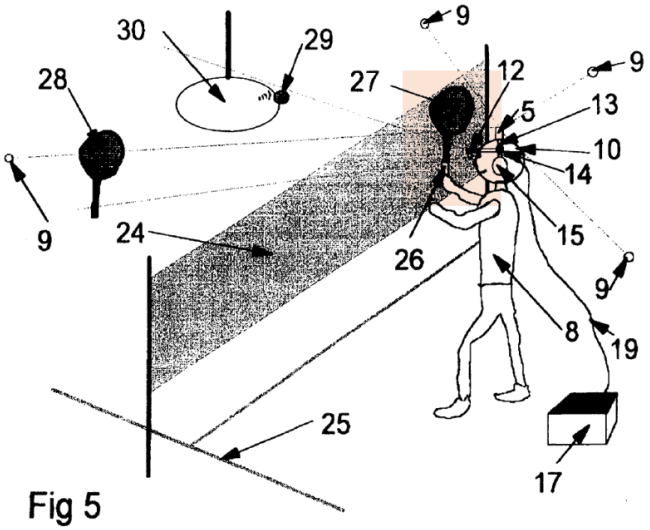


Fig 5

(Fager, Fig. 5 (highlighting added), ¶79; Cooperstock, ¶217.) Regarding component **26**, Fager discloses that "[t]he tool is designed as a handle of an ordinary tennis racket and includes a further transducer which is arranged to determine its position and/or orientation relative to the real environment in six degrees of freedom[.]" (Fager, ¶79 (emphasis added).)

It would have been obvious to use Fager's component **26** as a controller to

Levesque's system—implemented as a standalone head-mounted device in light of Ronzani. (Cooperstock, ¶218.) In this combination, a controller like Fager's component **26** would be used as a sensor **18** connected directly to Levesque's head-mounted device. (*Id.*) In this capacity, Fager's component **26** would constitute the controller required by claim 22.

In addition to the motivations to combine Levesque, Ronzani, and Fager discussed above regarding claim 9, a POSITA would have been motivated to combine Levesque's system (in combination with Ronzani) with Fager to enable sports location-based games requiring interaction with a racket or bat, including the tennis game Fager discloses. (Cooperstock, ¶219.) Levesque discusses using video gaming devices in such sports and exercise applications. (Levesque, ¶¶6, 41.)

C. Ground 3: Claim 14 is Obvious Over Ground 1 Prior Art in Further View of Ohshima

1. Claim 14: "The location based game system of claim 1, wherein:" (Claim 14[pre])

As discussed above, the combination of **Levesque** and **Ronzani** discloses and renders obvious "**[t]he location based game system of claim 1**." (Cooperstock, ¶220.)

(a) "said location based game comprises said virtual game character and said virtual game character is computer controlled;" (Claim 14[a])

As discussed above for claim 30[b], **Levesque** discloses claim 14[a]. (Cooperstock, ¶221.)

(b) "said location based game comprises a second virtual game character and said second virtual game character is user controlled; and" (Claim 14[b])

As discussed above for claim 30[c], **Levesque** discloses claim 14[b]. (Cooperstock, ¶222.)

(c) "said processing circuitry is operable to execute said computer programming to utilize at least one of said first control signal from said first locating device and said second control signal from said second locating device for controlling, at least in part, said virtual game character that is computer controlled." (Claim 14[c])

Levesque discloses and renders obvious claim 14[c], either alone or in light of **Ohshima**. (Cooperstock, ¶¶223-234.) Levesque discloses that "weapon fire from opponents **50** may be simulated on display **20**." (Levesque, ¶34.) Furthermore, Levesque discloses that the user can make real-world motions with a vehicle to "avoid launched weapons" in the game. (*Id.*) It would have been obvious based on Levesque's disclosures that simulated opponents **50** in Levesque's location-based games would fire weapons *at the user's location in the game*. (Cooperstock, ¶224.) Indeed, Levesque discloses that "[t]he position and speed of the vehicle **100** may be taken into account when presenting the simulated images on display 20[,]" where

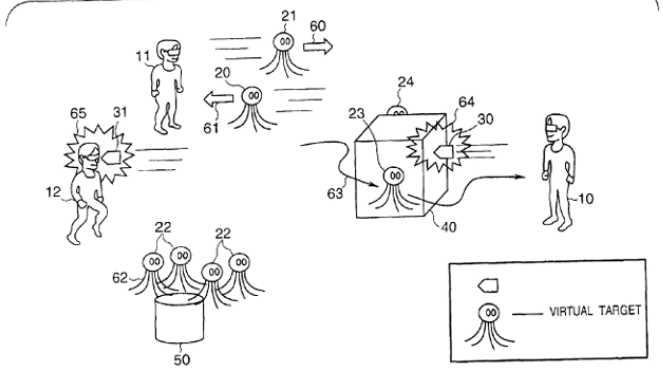
the simulated images include simulated opponents. (Levesque, ¶34) Since Levesque's system determines the user's in-game location based on the user's real-world location, this obvious implementation of Levesque's video gaming device would include the required functionality of claim 14[c]. (Cooperstock, ¶224.)

It would have been obvious to implement simulated opponents **50** such that they fire weapons at the user's location to increase a user's enjoyment of the game. (Cooperstock, ¶225.) Levesque discloses that a user can avoid in-game enemy weapon fire by maneuvering a real-world vehicle. (Levesque, ¶34.) Accordingly, a POSITA would have understood based on Levesque's disclosures that avoiding virtual weapon fire constitutes entertaining gameplay. (Cooperstock, ¶225.) A POSITA would have also recognized that the entertainment value of such gameplay would be improved if simulated opponents **50** were programmed to fire toward the user's location in the game. (*Id.*) A POSITA would have recognized that such functionality would increase the chances that weapon fire would come close enough to a user's in-game location that a user would need to make efforts to avoid the weapon fire. (*Id.*) Thus, a POSITA would have recognized that if simulated opponents **50** fire at the user, the game will be more entertaining. (*Id.*)

To the extent there is any question as to whether Levesque satisfies claim 14[c], it would have been obvious in view of **Ohshima**. (Cooperstock, ¶¶226-234.) Ohshima discloses that virtual characters are controlled by the computer to use the

real-world posture and location of players to control enemy behavior. (*Id.*, ¶¶83-88.) For example, Ohshima discloses that virtual characters "make actions such as collision, explosion, movement, dodge, and the like in consideration of the presence, location, layout, and behavior of the real objects or the location, behavior, and line of sight of the player." (Ohshima, 6:12-17.) Ohshima Figure 1 shows example behaviors:

FIG. 1



(Ohshima, Fig. 1.) For example, Figure 1 shows that the behavior of virtual characters **20** and **21** depends on the location of player **11**—*i.e.*, the virtual characters run toward and away from the player's location, respectively. (*Id.*, 6:2-4.) Other virtual characters (**22**, **23**, and **24**) are shown behaving based on the locations of real objects **40** and **50**. (*Id.*, 6:5-11.) Ohshima discloses that the in-game location can be based on real-world location as determined by sensors. (*Id.*, 1:9-14, 1:54-2:9, 6:29-33, 6:12-17.) Accordingly, Ohshima discloses that at least one locating device control signal is used for controlling virtual game characters. (Cooperstock, ¶227.)

Based on Ohshima's disclosures, it would have been obvious to implement Levesque's system such that virtual characters react to the real-world location of the user (as determined by Levesque's disclosed sensors). (Cooperstock, ¶228.) For example, it would have been obvious to implement computer programming for simulated opponents **50** in Levesque's video gaming device such that they move toward or away from a user, per Ohshima's disclosures. (*Id.*)

Rationale and Motivation to Combine (Levesque, Ronzani, and Ohshima): It would have been obvious to combine Ohshima's teachings regarding virtual character behavior based on the location of real players and objects with Levesque (under the proposed combination with Ronzani). (Cooperstock, ¶¶229-234.) The combination would have involved the straightforward incorporation of Ohshima's virtual character behaviors into Levesque's system (as implemented as a standalone system in light of Ronzani's teachings). (*Id.*, ¶229.) The combination therefore discloses and renders obvious claim 14(c). (*Id.*)

Levesque, Ronzani, and Ohshima are all analogous references to the '243 patent. (Cooperstock, ¶230.) As discussed above for claim 1[b], Ronzani and Levesque are analogous references to the '243 patent. Further, like the '243 patent, Ohshima is in the field of portable user-worn devices for providing location-based entertainment. ('243, 2:28-51, 1:22-23; Ohshima, 1:9-14 ("[t]he present invention relates to a game apparatus which allows a player to play a game in a mixed reality

space which includes both real and virtual objects"), 3:41-59 (describing "mixed reality environment[s]"), 1:53-2:17, Figs. 1-5; Cooperstock, ¶230.) Further, Levesque, Ronzani, and Ohshima would have been reasonably pertinent to problems facing the '243 patent inventor, including implementation of a multiplayer location-based game. (Cooperstock, ¶230.)

A POSITA would have been motivated to combine Levesque (in combination with Ronzani) with Ohshima. (Cooperstock, ¶231.) A POSITA would have recognized that implementing virtual characters that behave based on real-world characteristics of a user would make Levesque's location-based games more enjoyable. (*Id.*) For example, Ohshima discloses that "since the movements/actions of a virtual object are determined in consideration of its relation with real objects (that can include a player) in a mixed reality space, the game becomes more fun to play." (Ohshima, 12:3-7.)

Additionally, a POSITA would have understood that implementing Levesque's virtual characters based on Ohshima's teachings would have made the virtual characters more realistic simulations of real-world people. (Cooperstock, ¶232.) A POSITA would have been motivated to make Levesque's location-based games more realistic. (*Id.*) For example, Levesque discloses that its location-based games comprise "simulated reality." (Levesque, ¶7; *see also id.*, ¶¶34 ("simulated opponents"), 41 (describing a "realistic backdrop").) Furthermore, Ohshima

discusses that it is more fun to play a game that has a virtual object that acts "as if [it] had its own will." (Ohshima, 2:33-38.)

The combination would have used a known technique (controlling virtual characters based on a user's real-world location) to improve a similar device (Levesque's video gaming device) in the same way. (Cooperstock, ¶234.) Moreover, because the details of implementing computer control of virtual characters are not a focus of Levesque, a POSITA, seeking to implement and adapt Levesque's teachings for use with computer controlled virtual characters, naturally would have turned to Ohshima for its complementary applicable teachings and motivations. (*Id.*)

VII. CONCLUSION

Petitioner respectfully requests IPR institution.

Dated: April 5, 2025

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CERTIFICATE OF COMPLIANCE WITH WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), I certify that this petition complies with the type-volume limits of 37 C.F.R. § 42.24(a)(1)(i) because it contains 13,871 words, according to the word-processing system used to prepare this petition, excluding the parts of this petition that are exempted by 37 C.F.R. § 42.24(a) (including the table of contents, a table of authorities, mandatory notices, a certificate of service or this certificate word count, appendix of exhibits, and claim listings).

DATED: April 6, 2025

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CERTIFICATE OF SERVICE

I hereby certify, pursuant to 37 C.F.R. Sections 42.6 and 42.105, that a complete copy of the attached **PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 11,904,243 B2,** including all exhibits (**Nos. 1001-1013**) and related documents, are being served via Federal Express on the 6th day of April, 2025, the same day as the filing of the above-identified document in the United States Patent and Trademark Office/Patent Trial and Appeal Board, upon Patent Owner by serving the correspondence address of record with the USPTO as follows:

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UNITED STATES

And, via Federal Express upon counsel of record for Patent Owner in the litigation pending before the U.S. District Court for the Western District of Texas entitled *Mullen Industries LLC v. Meta Platforms, Inc.*, Case No. 1:24-cv-00354-DAE (W.D. Tex.) as follows:

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