

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

META PLATFORMS, INC.,
Petitioner,

v.

MULLEN INDUSTRIES LLC,
Patent Owner.

Case No. IPR2025-00703
U.S. Patent No. 11,033,821

PATENT OWNER'S PRELIMINARY RESPONSE

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Exhibit	Description
2001	Dictionary definition of “Playing field” – Merriam-Websters Collegiate Dictionary. 10 th Ed., 2001
2002	Dictionary definition of “playing field” – The Chambers Dictionary, 2003
2003	Dictionary definition of “playfield” – Dictionary of Architecture & Construction, 2000
2004	Dictionary definition of “playfield” – Webster’s Third New International Dictionary of the English Language Unabridged, 2002
2005	<i>Reserved</i>
2006	<i>Reserved</i>
2007	<i>Reserved</i>
2008	<i>Reserved</i>
2009	<i>Reserved</i>
2010	<i>Reserved</i>
2011	<i>Reserved</i>
2012	Dictionary definition of “force majeure” – Merriam-Webster Dictionary,

	https://www.merriam-webster.com/dictionary/force%20majeure
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Mullen Industries LLC (“Patent Owner” or “Mullen”) submits this Preliminary Response to the Petition for *Inter Partes* Review (“Petition”) of U.S. Patent No. 11,033,821 (“the ’821 patent”) filed by Meta Platforms, Inc. (“Petitioner”).

I. Introduction

The ’821 patent improves upon prior-art virtual reality (“VR”) systems in which a user might unintentionally run into objects while playing the game due to obscured vision. It also improves prior systems that attempted to solve that problem by using safety rails surrounding a small platform. These prior systems provided some measure of safety but still presented risks and also prevented using natural body movement to play a game, instead relying on joysticks and the like to control movement about a playfield in a game.

The Board should deny institution under 35 U.S.C. § 314(a) because none of the Petition’s Grounds 1-5 establishes the required reasonable likelihood of success. Grounds 1 and 4 address independent claim 1 and dependent claims thereof. Grounds 3 and 5 address independent claim 102 and dependent claims thereof. Ground 2 only addresses claims that depend from claim 1.

All Claims, All Grounds: All challenged claims require a “physical playfield,” which under the proper construction is a “bounded physical play space.” No ground or prior art combination in the Petition teaches or suggests a physical

playfield. Each ground relies on either Cheok or Nakamura as allegedly disclosing a physical playfield. However, both of these references adopt the prior-art approach wherein a user plays a game in unbounded space, leading to exactly the problems with the prior art described in the '821 patent: that the user might run into objects unintentionally while playing. Nor does the Petition propose modifying this aspect of either reference. All grounds thus fail to teach a “physical playfield,” which is required by all challenged claims.

Claim 1 Grounds: Further, Grounds 1 and 4, which concern claim 1, fail to anticipate or render obvious multiple elements of claim 1. For example, the grounds fail to disclose or render obvious that “a direction of gameplay of said videogame is operable to be established by recording a manually provided direction in response to a prompt requesting said manually provided direction,” as required by challenged independent claim 1. Regarding Ground 1, the Petition concedes that Cheok does not establish a direction of gameplay by “recording a manually provided direction in response to a prompt requesting said manually provided direction,” instead relying on combination with Foxlin077 for that functionality. However, Foxlin077 discloses establishing only a baseline orientation of a controller, rather than a *manually provided direction*, much less a *direction of gameplay*. And there is no motivation to use the initialization procedure of Foxlin077 in Cheok, a reference in which the authors apparently built a real, functional system, without any indication it would

benefit from the added initialization steps hypothesized by the Petition. In Ground 4, the Petition concedes that Nakamura does not disclose “recording a manually provided direction in response to a prompt requesting said manually provided direction,” instead relying on combination with Benini. However, Benini discloses only using arrow buttons on a user interface to change the orientation of a 2D map to view historic sites. It does not disclose or render obvious a manual input related to a direction of gameplay. Moreover, there is no motivation to use Benini’s arrow buttons in Nakamura, which already has its own navigation system—tracking a user’s actual movement in the real world—and thus has no use for Benini’s button-driven navigation.

Claim 102 Grounds: Regarding Grounds 3 and 5, which concern claim 102, the grounds fail to anticipate or render obvious multiple elements of claim 102. Claim 102 requires that “an origin of gameplay of said video game is operable to be established by recording a manually provided origin in response to a prompt requesting said manually provided origin.” In both grounds, the Petition relies solely on Nakamura as allegedly disclosing the manually-provided origin of gameplay in response to a prompt requesting it. But Nakamura only discloses establishing an initial virtual position of a virtual character, rather than an “origin of gameplay,” which must be a physical location. Additionally, both Grounds 3 and 5 fail to even address claim 102’s requirement of “a virtual character... facing a virtual direction

on a virtual playfield. . . and said virtual direction on said virtual playfield corresponds to said physical direction on said physical playfield,” as they refer to Grounds 1 and 4, which do not contain discussion of that element because it does not exist in claim 1. To the extent an allegation could be divined from the discussion of claim 1, it fails on the merits to disclose or render obvious the claim requirements.

II. Technology Primer And Prior Art Problem

The challenged claims generally relate to virtual-reality (“VR”) video game systems. More specifically, the ’821 patent is directed to an “actual, reality-based video game in which a user’s physical (actual) location on a playfield, reflects a virtual game character’s virtual location in a video game environment.” Ex. 1001, 2:27-30.

A. Background Of The Relevant Technology

Virtual reality is a computer-generated environment which can be explored and interacted with by a user. Virtual reality has a wide variety of applications, including immersive video games.

B. Problems In The Prior Art

The ’821 patent identifies several problems with prior-art VR systems. The patent explains that “[v]irtual reality games have been developed where a user places a helmet on his/her head and is immersed into an alternate reality via a display located on the helmet.” Ex. 1001, 1:23-25. “This user is then allowed to move

through an alternate reality by means of a joystick.” *Id.*, 1:25-27. However, “[a] user is limited in actual physical movement by means of a very small (e.g., 48 inches) enclosed virtual reality platform.” *Id.*, 1:28-30. Thus, these “traditional virtual reality systems are deficient because of the need for additional, unneeded manual actions to be made to move a joystick in order to move the user through the alternate reality.” *Id.*, 1:30-34. “It is therefore desirable to provide a game system with improved user controls.” *Id.*, 1:34-35.

Additionally, “[t]raditional virtual reality systems are also unsafe because a user cannot visually see his/her physical environment.” *Id.*, 1:36-37. As alluded to in the ’821 patent, the prior-art solution to this safety problem was to provide a small virtual reality platform with guard rails. *Id.*, 1:38-39. An example of such a solution is depicted below:



However, even in such a system, “a user may become distorted in the alternate reality and lose a sense of direction as to where such rails are located,” which could cause the user to “dangerously contact such guard rails or foreign objects introduced onto a virtual reality platform.” *Id.*, 1:39-43. “It is therefore desirable to provide safer game systems.” *Id.*, 1:43-44.

Thus, the '821 patent identifies that prior-art VR systems presented both a problem—dangerous, unbounded gameplay whereby a user could come into contact with objects while playing—and an insufficient solution—highly physically constrained gameplay using physical safety rails that could still be collided with and

leading to unnatural movement, requiring a joystick to move a character in a game. The '821 patent proposes a better solution.

III. The Challenged Patent

A. The Patent's Solutions For Prior Art Problems

The '821 patent solved the aforementioned problems with the prior art, allowing for more natural movement in a safe environment. The patent's claims describe systems for providing location-based video games employing a physical playfield and a corresponding virtual playfield. The claimed systems include a "locating device operable to determine the physical location of said locating device on a physical playfield." Ex. 1001, Claims 1 and 102. By utilizing such locating devices, the systems enable a user to control a virtual character's location on a video game's virtual playfield simply by moving around the physical playfield and without requiring every such movement to be input to a handheld control device, such as a joystick. Ex. 1001, 8:8-16.

Critically, the '821 patent claims also require a bounded physical play space for playing a video game (*i.e.*, a "physical playfield"). *See, e.g.*, Ex. 1001, 6:15-7:5, 21:30-52. By utilizing a bounded space, the claimed invention solves the problem of risky movement or deviation during gameplay, which could lead to a user tripping or bumping into a physical object, while at the same time not requiring confining

players to a small platform with safety rails, which would impede natural movement. The bounded nature of the playing space is central to the claimed invention.

The establishment of the boundaries of a physical playfield allows for the creation of a corresponding virtual playfield and a “virtual location on said virtual playfield [that] corresponds to said physical location on said physical playfield,” as recited in claim 1. For example, “[a] grid may be included... on display 1030 that is associated to different location areas that a user may travel in.” *Id.*, 17:56-58 (describing Fig. 10). “Character 1091 may be included to represent the grid location on the virtual playfield that the user’s actual location on a physical playfield corresponds to.” *Id.*, 17:58-60.

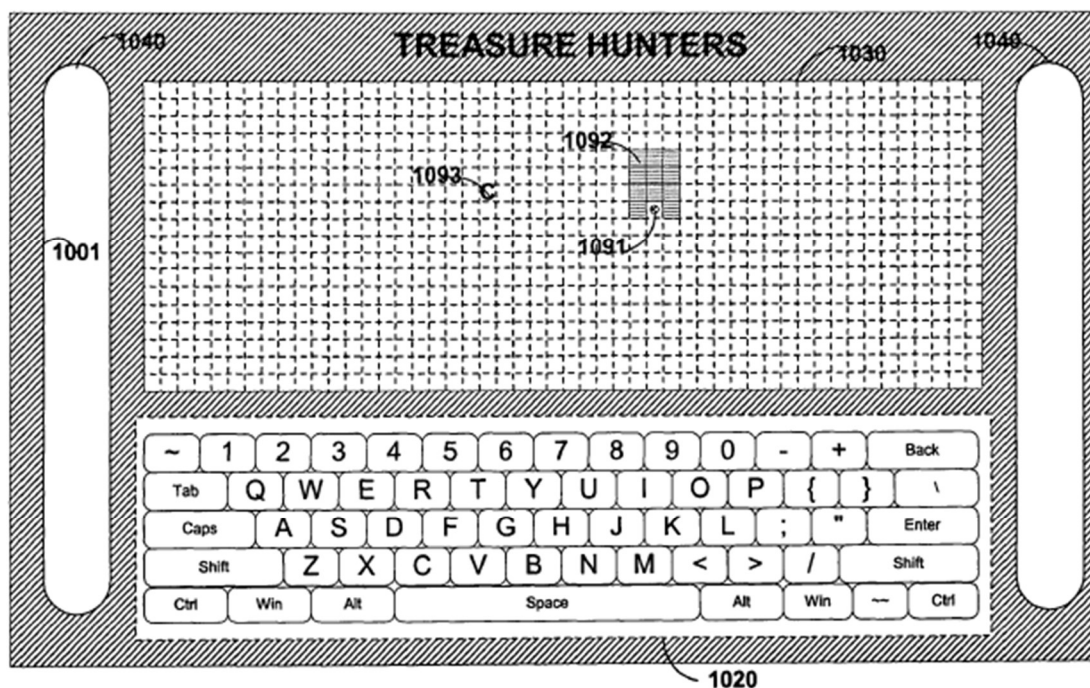


FIG. 10

Id., Fig. 10. The bounded nature of the playing space is critical to the safety and gameplay of the claimed invention. Importantly, the physical playfield boundaries need not be hard physical boundaries like the safety rails of the prior art. The boundaries are known to the system and can be conveyed to the user during gameplay. For example, when playing a “FROGGER” game, “[a]t the end of each level... the user may be requested to return to the original origin,” a functionality made possible by virtue of the system’s knowledge of the boundaries of the physical playfield. *Id.*, 15:63-67.

In addition, using a bounded space allows the claimed system to detect when a user goes out of bounds on the physical playfield and notify him or her of that fact. Advantageously, an “icon may be provided when such *a user goes out of bounds* that shows the user where out of bounds the user is located,” which “may be beneficial to allow a user to more easily find the left-behind game character’s position.” *Id.*, 15:58-62. Further, the game can take various actions in-game when a user goes out of bounds. *Id.*, 9:19-24 (“[A] location reading outside of a perimeter may still be utilized as a control signal (e.g., to deduct a particular number of points from a user’s score).”). Thus, the ’821 patent’s teachings of a physical playfield eliminate the need for potentially dangerous guard rails, while still informing the user of the metes and bounds of the physical playfield.

Moreover, the patent's teachings of a physical playfield also enable configuring larger and more-customizable physical playfield dimensions than prior-art systems. The claimed invention utilizes the physical playfield's dimension information to translate and scale the physical playfield to a virtual playfield. *Id.*, 6:49-51. This in turn enables the system to provide a wider variety of games, including multiplayer games between users in different physical locations. *Id.*, 6:49-7:5. For example, "a child in his/her backyard in the U.S. may play a game of virtual PACMAN with his/her father that is located in a park in Japan." *Id.*, 3:21-23. The claimed invention may also utilize the boundary locations of a physical playfield to provide games that are larger than the physical playfield:

Since such a game may be ***larger than an actual playfield (e.g., a soccer field)***, an origin may be manually reset at any time where the origin may be representative of a mid-game starting position. For example, ***if a user reaches the end of his/her physical playfield*** at the position of the grid that character 1091 resides then the user may reset that location to the origin, turn around, and set that direction and the reference direction.

Id., 18:21-28 (emphasis added).

The '821 patent specification lists multiple examples for setting the boundaries of the physical playfield, including (1) setting specific "physical

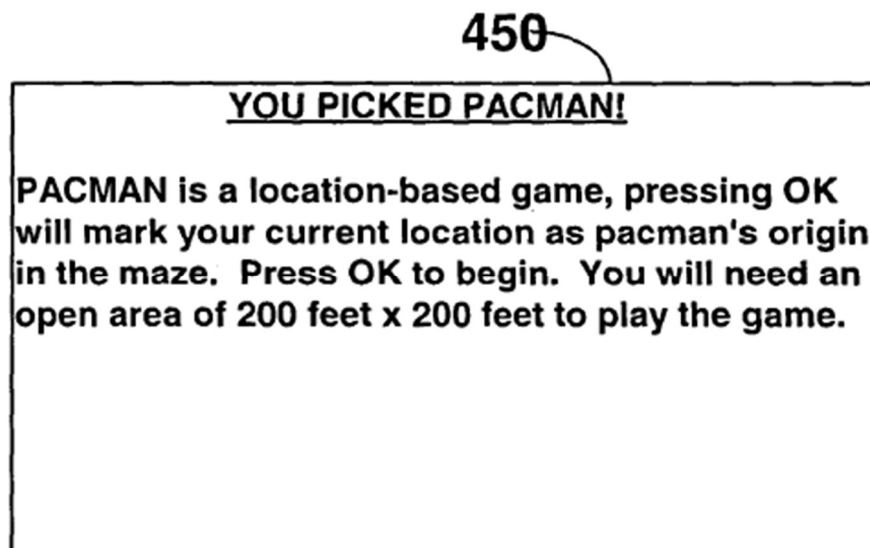
playfield dimensions,” including that the user may be “requested to confirm that user's selected dimensions (or display that user's selected dimensions)”; (2) choosing a “shape of the playfield (e.g., a circle square, or rectangle)”; and (3) “go[ing] to a physical playfield boundary that the user desires and establish[ing] that location as a location boundary for a game.” *Id.*, 6:23-49; *see also id.*, 9:11-15 (“[I]n some embodiments, a user may select a perimeter by, for example, going to locations on the perimeters (e.g., the corners of a rectangle) and recording these perimeter locations.”). Further, while initializing the location-based game, “[t]he dimensions of the physical playfield may be operable to be changed by a user.” Ex. 1001, 6:15-27. For example:

[A] user may be provided with a number of physical playfield dimensions to choose from.... In multiplayer embodiments, for example, a user may determine playfield dimensions and an opponent may be, for example, requested to confirm that user's selected dimensions (or display that user's selected dimensions). Alternatively, each user may select different dimensions for their local, physical playfield and control signals may be appropriately scaled.... Default dimensions for the physical playfield may be utilized by a video game and displayed to a user. Such dimensions may be changed during operation of the video game (e.g., a game may be PAUSED, taken to a different physical playfield, and the

physical playfield dimensions may be changed before the game is RESTARTED).

Id., 6:25-40. In some embodiments, “[d]efault dimensions for the physical playfield may be utilized by a video game and displayed to a user.” *Id.*, 6:34-36. But in all cases and as reflected in the claims, the playing space must be bounded, *i.e.*, it must be a physical *playfield*, not an unbounded space.

Another important aspect of establishing a physical playfield is that the user has direct control over the location in which he or she will start the game in the physical world (the “origin of gameplay”) and/or in what direction he or she will be playing (the “direction of gameplay”). For example, “a GUI may be provided that prompts a user on how much free physical space is need on all sides of the origin for gameplay.” *Id.*, 6:15-20. Screen 450 of Figure 4 illustrates such a GUI:



Id., Fig. 4 (partial). Moreover, a physical origin location is also used as a “reference location during gameplay.” *Id.*, 9:25-31. “Multiple features may be provided as the result of including . . . one or more reference/origin values,” including a “multiplayer feature where the players may be located on different physical playfields.” *Id.*, 9:31-35. In addition to setting the origin for gameplay, the system can prompt the user to manually input a direction for gameplay, increasing user control. *Id.* 15:63-16:13.

The challenged claims of the ’821 patent capture the above-described features.

Independent Claim 1 recites:

1. A system comprising:

a wireless communication device, wherein said wireless communication device comprises:

a display;

a locating device operable to determine the physical location of said locating device on *a physical playfield*; and

a processor coupled to said display and said locating device, wherein said processor is operable to provide a video game comprising a virtual character with a virtual location on a virtual playfield, said virtual character is displayed on said display, said virtual location on said virtual playfield corresponds to said physical location on said physical playfield, and *a direction of gameplay of*

said videogame is operable to be established by recording a manually provided direction in response to a prompt requesting said manually provided direction.

(emphasis added)

Similarly, independent Claim 102 recites:

102. A system comprising:

a non-transparent display;

a locating device operable to determine the physical location of said locating device on *a physical playfield*, wherein said locating device comprises a movement measuring device operable to be utilized, at least in part, to determine said physical location;

a directional device operable to determine the physical direction of said directional device on said physical playfield; and

a processor coupled to said display and said locating device, wherein said processor is operable to provide a video game comprising a virtual character with a virtual location and facing a virtual direction on a virtual playfield said virtual location on said virtual playfield corresponds to said physical location on said physical playfield, *an origin of gameplay of said videogame is operable to be established by recording a manually provided origin in*

response to a prompt requesting said manually provided origin, and said virtual direction on said virtual playfield corresponds to said physical direction on said physical playfield.

(emphasis added)

IV. The Proper Claim Construction

The term “physical playfield,” as recited in Claims 1 and 102, should be construed to be a “bounded physical play space.” Such a construction is supported by both the intrinsic record and extrinsic evidence, consistent with *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005).

The '821 patent specification consistently describes a “physical playfield” as having a boundary. *See, e.g.*, Section III.A; Ex. 1001, 6:15-40, 9:11-16, 15:51-55, 18:21-28 (“For example, if a user reaches *the end of his/her physical playfield...*”). For example, a user can change the specific dimensions of a physical playfield. *Id.*, 6:23-24. For multiplayer games, “each user may select different dimensions for their local, physical playfield.” *Id.*, 6:28-34. Further, “a user may go to a physical playfield boundary that the user desires and establish that location as a location boundary for a game.” *Id.*, 6:45-49. The system may also provide “a number of choices as to the shape of a physical playfield (e.g., a circle, square, or rectangle).” *Id.*, 6:43-45.

Moreover, the specification details how playfield dimensions are used in providing a location-based game:

Dimensions information may be utilized by a video game system to determine how to scale location-based inputs. For example, if a user is playing an actuality game of PACMAN then a user movement in a 10 ft.x10 ft. playfield may result in PACMAN moving faster than that same user movement in a 100 ft.x100 ft. foot [sic] physical playfield. Accordingly, a video game system may scale location inputs such that a person playing on a 10ft.x10ft. playfield may play in in the same virtual playfield (although multiple displays may display the virtual playfield) as a user playing on a 100 ft.x100 ft. playfield. A program may scale user inputs based on, for example, the dimensions (e.g., size) of both user's playfield or scale to a user defined or default playfield.... Dimension information for a user's physical playfield may also be transmitted to other user's game system.

Ex. 1001, 6:49-7:1. The usage of physical dimensions information to scale location-based inputs is reflected in Claims 1 and 102, which both recite that “said virtual location on said virtual playfield corresponds to said physical location on said physical playfield.” Ex. 1001, Claims 1 and 102. Thus, within the context of the claims, a “physical playfield” must have defined boundaries such that the claimed

system can translate virtual locations to physical locations. *Sequoia Tech., LLC v. Dell, Inc.*, 66 F.4th 1317, 1326 (Fed. Cir. 2023) (citing *Kaken Pharm. Co. v. Iancu*, 952 F.3d 1346, 1352 (Fed. Cir. 2020) (“A patent’s statement of the described invention’s purpose informs the proper construction of claim terms.”)); *Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1308 (Fed. Cir. 2007) (“When a patent . . . describes the features of the ‘present invention’ as a whole, this description limits the scope of the invention.”). Accordingly, a POSITA would have understood that the ’821 patent’s “physical playfield” must be a bounded physical play space.

Dictionary definitions also support Patent Owner’s construction. For example, Merriam-Webster’s Collegiate Dictionary defines “playing field” as “a field for various games; *esp* the part of a field officially **marked off for play**.” Ex. 2001, 3. Similarly, The Chambers Dictionary defines “playing field” as “a grass-covered space **set apart, marked out**, and kept in order for games.” Ex. 2002, 3. The Dictionary of Architecture & Construction defines “playfield” as “[a]n area **designed** for field games.” Ex. 2003, 3. Similarly, Webster’s Third New International Dictionary defines “playfield” as “a playground **designed** for outdoor athletics and games.” Ex. 2004, 3.

Thus, “physical playfield,” as recited in Claims 1 and 102, should be construed to be a “bounded physical play space.”

V. The Petition

The Petition asserts four grounds, namely 1, 3, 4, and 5, against independent claims, here claims 1 and 102:

Ground	Claims	Statute	Prior Art ¹
1	1, 11	pre-AIA 35 U.S.C. § 103	Cheok (EX1006), Foxlin077 (EX1008)
2	16, 30		Cheok, Foxlin077, Rallison (EX1014)
3	102		Cheok, Nakamura (EX1007)
4	1, 4, 11, 16, 30		Nakamura, Benini (EX1009)
5	102		Nakamura

Pet., 1. This preliminary response explains why Grounds 1, 3, 4, and 5 each fail below. Ground 2 merely adds a reference (Rallison) to the combination of Ground 1 in order to attempt to address dependent claims 16 and 30, which depend from claim 1, but Ground 2 does not change Ground 1’s analysis for claim 1 and thus Ground 2 fails for the same reasons Ground 1 does, explained below, for failure to render obvious independent claim 1. Pet., 38-41. Thus, all grounds fail.

A. Cheok

Cheok describes “Human Pacman,” “an interactive ubiquitous and mobile entertainment system that is built upon position and perspective sensing via Global Positioning System and inertia sensors; and tangible human-computer interfacing with the use of Bluetooth and capacitive sensors.” Ex. 1006, Abstract. A wearable computer employs sensors to track players’ locations and head positions. This information is then used to “superimpose[] a 3-D virtual cookie image of a

proportionate size on corresponding position on the video stream” and “update the 2-D virtual map in the HMD view of the player.” *Id.*, 3-4. The wearable computers are also in communication with a centralized server, which “maintains up-to-the-minute players’ information (location, status etc.), and presides over any communication between Bluetooth objects and the wearable computers.” *Id.*, 4-5.

Notably, Cheok does not teach or suggest establishing the boundaries of a play space and thus does not describe a “physical playfield.” Instead, Cheok describes playing in an unbounded space by simply playing in the real world and “embedding the natural physical world . . . with a fantasy virtual playground.” Ex. 1006, Abstract. Moreover, Cheok never explains how it translates or scales the physical world to its virtual “Pac-World.”

Cheok also lacks any disclosure regarding manually providing an origin of gameplay or a direction of gameplay in response to a prompt requesting such manual input, as the Petition concedes, relying on Nakamura (Ground 3) and Foxlin077 (Ground 1), respectively for those elements.

B. Foxlin077

Foxlin077 provides “an inertial angular orientation tracking apparatus.” Ex. 1008, 6:20-22. Specifically, the device is “a self contained sensor apparatus for generating a signal that corresponds to at least two of the three orientational aspects of yaw, pitch, and roll of a human-scale body, relative to an external reference

frame.” Ex. 1008, 3:54-58. “The invention does not produce position information, only angular orientation information.” *Id.*, 6:22-23. One disclosed embodiment of the sensor is a head-mounted orientation sensor, as shown below:

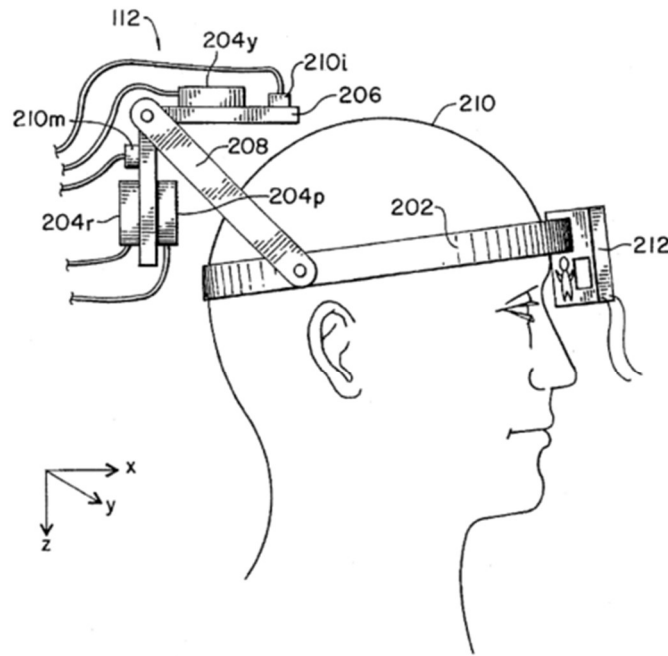


FIG. 2A

Ex. 1008, Fig. 2A.

Foxlin077 discusses “initialization steps,” which “establish the rest position” of the sensor for future measurements. *Id.*, 9:65-10:2. These initialization steps thus allow the system to make accurate physical measurements regarding an orientation of the sensor, rather than setting a “direction of gameplay” that impacts a virtual reality video game. Thus, Foxlin077 fails to disclose or render obvious the claimed ability for the system to establish a direction of gameplay by recording a manually-

provided direction, as (1) the reference has nothing to do with gameplay, and (2) the initialization step the Petition points to merely establishes a baseline “rest position” for more accurate future measurements, not any direction manually provided by the user, let alone a direction of gameplay.

C. Nakamura

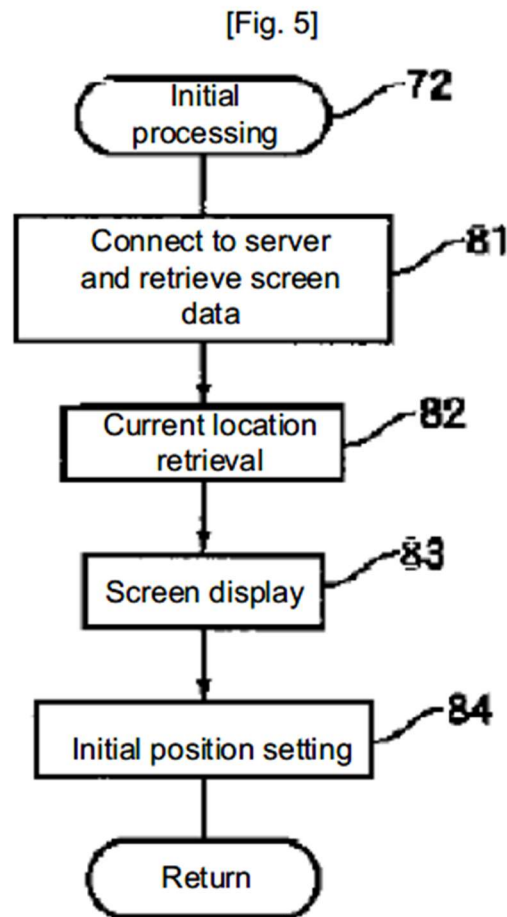
Nakamura relates to “a system for controlling a computer based on location information.” Ex. 1038, ¶ [0001]. More specifically, Nakamura describes a system for providing a role-playing video game that “allows the user to control [a] virtual world [by] physically moving their actual location.” *Id.*, ¶ [0006].

Like Cheok, Nakamura does not disclose establishing the boundaries of a physical playfield, instead describing playing in an unbounded space “in the real world.” *Id.*, ¶ [0005]. As relied upon by the Petition, Nakamura generally discloses using GPS to track a user’s “movement through the real world,” without any discussion of a bounded play space. Pet., 57-58; Ex. 1038, ¶ [0005].

Nakamura contains no disclosure that teaches or suggests establishing a bounded space for gameplay. Indeed, Nakamura implies that in some embodiments the virtual world and the physical world may not correspond at all. *Id.*, ¶ [0008] (“the user’s movements [in the virtual world] are not limited to representations reflecting the real world, such as maps. Instead, they can be reflected in virtual worlds that are further removed from reality.”). Nakamura touts this lack of

correspondence as “introduc[ing] an element of force majeure-like restriction,” *i.e.*, that a user may run into real objects, “providing an additional way to enjoy the game.” *Id.*

Nakamura’s Figure 5 is a flowchart illustrating four “initial processing” steps:



Ex. 1038, ¶ [0032], Fig. 5. When a new game is initialized, “the current location is obtained using the location acquisition function 11.” *Id.*, ¶ [0034]. At step 84, a “position icon 113... can be arranged according to the user’s preference,” thereby allowing a user to select an initial virtual position within the virtual world. *Id.*, ¶

[0035]. But, unlike in the '821 patent claims, the moving of the virtual position icon does not set an origin of gameplay, which is the user's origin of gameplay in the physical world, as explained above in Section III.A. Nor does Nakamura disclose establishing a direction of gameplay.

D. Benini

Benini “aims at exploring the potential of using portable devices in managing interaction in (semi)Immersive Virtual Reality (IVR) systems reconstructing cultural heritage objects and environments.” Ex. 1009, Abstract. Benini discloses a user interface featuring “a two-dimensional map abstraction of the VR world, augmented with various navigation controls.” *Id.*, 3, Fig. 2. As shown below, Benini's system displayed a 2D map on a PDA and included arrow buttons for navigating through the 2D map.

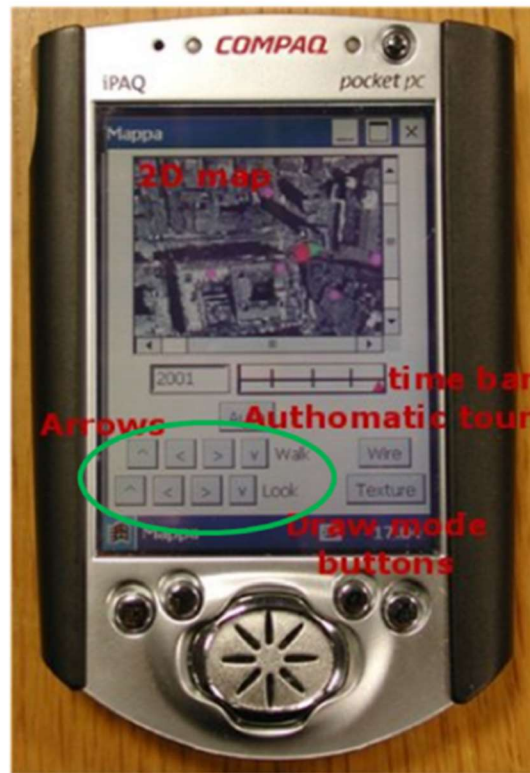


Figure 2: The User Interface developed for interacting via PDA with the Nu.M.E. VE

Pet., 68 (showing annotated Ex. 1009, Fig. 2). As shown, the arrow buttons are labeled “Walk” and “Look.” According to the Petition, the “arrows can be used to ‘change [the] camera’s position and orientation (interacting with the 2D map or with the arrows),’ thereby changing the view in the environment.” Pet., 68.

Notably, Benini does not disclose a video game; rather, its purpose is to “reconstruct[] cultural heritage objects and environments” and allow users to view virtual heritage sites. Ex. 1009, Abstract.

VI. The Board Should Deny Institution Because The Petition Does Not Establish The Required Reasonable Likelihood Of Success

The Petition should be denied because Grounds 1-5 all fail to establish the required reasonable likelihood of success.

A. All Grounds And Prior Art Combinations Fail to Disclose Or Render Obvious “A Physical Playfield,” Which Is Required by All Challenged Claims

The only challenged independent claims, 1 and 102, recite “a locating device operable to determine the physical location of said locating device *on a physical playfield*” (limitations 1[a.2] and 102[b]) and “said virtual location on said virtual playfield corresponds to said physical location *on said physical playfield*.” (limitations 1[a.3] and 102[d]). Pet., 1. The only challenged dependent claims 4, 11, 16, and 30 all depend from claim 1. *Id.* Thus, all challenged claims require a “physical playfield.”

In Grounds 1 and 3, the Petition exclusively relies on Cheok, without modification, for the claimed physical playfield. Pet., 21-22, 27-28, 42-44, 53-55. In Grounds 4 and 5, the Petition exclusively relies on Nakamura, without modification, for the claimed physical playfield. Pet, 57-58, 63-64, 78-79, 83.

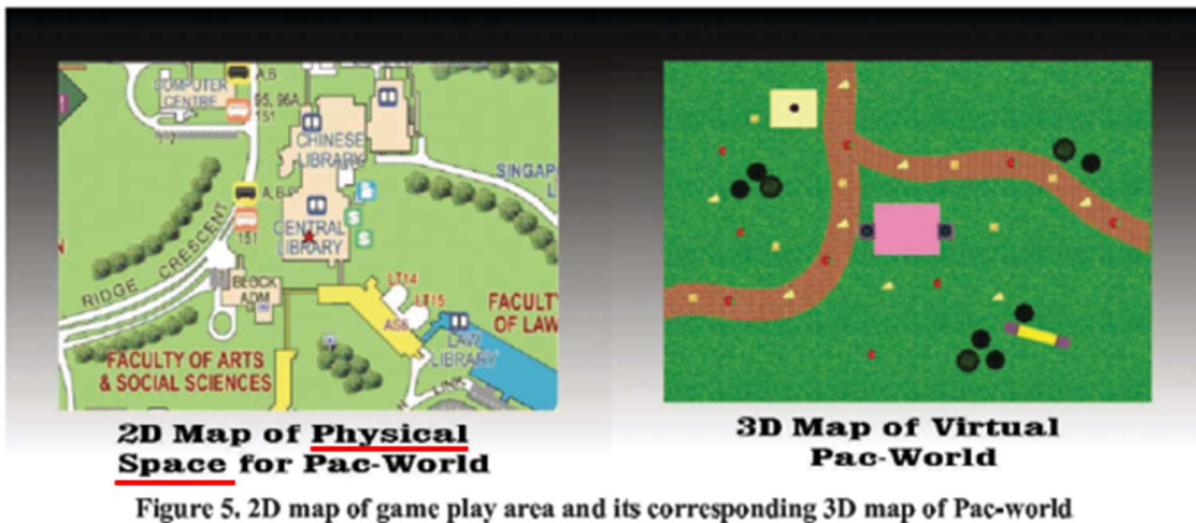
However, neither Cheok nor Nakamura discloses or renders obvious a bounded physical play space. Nor does the Petition propose modifying the playing spaces described in any asserted reference. Pet., 21-22, 27-28, 42-44, 53-55, 57-58,

63-64, 78-79, 83. Thus, all grounds fail to disclose or render obvious a physical playfield, and thus all grounds fail and institution should be denied.

1. Cheok Fails To Disclose Or Render Obvious “A Physical Playfield” (Claims 1, 102) (Grounds 1, 3)

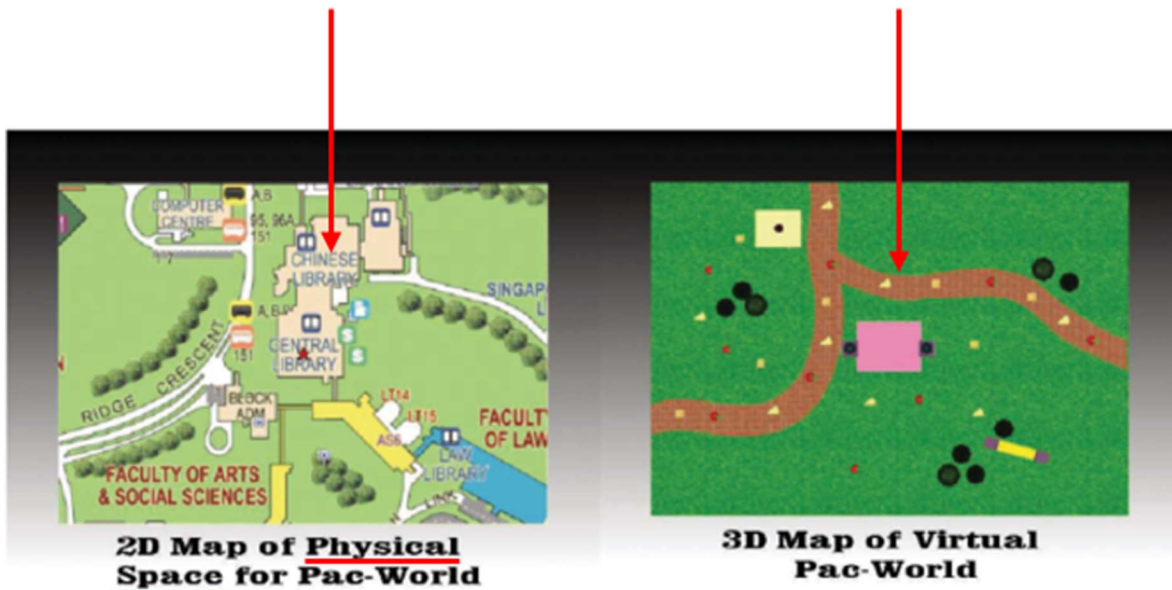
Petitioner argues that Cheok’s GPS and DRM sensors are “a locating device operable to determine the physical location of said locating device on a physical playfield.” Pet., 21-22. But the Petition incorrectly equates the “physical world” with a “physical playfield.” *See id.*, 22 (“as the user moves through the physical world (on a physical playfield).” The Petition never identifies any disclosure in Cheok of boundaries in the physical world that would constitute a “physical playfield” as required by the challenged claims. *Id.*, 21-22. Nor could it, because Cheok makes no mention of any such boundaries. Instead, Cheok teaches simply “embedding the natural physical world... with a fantasy virtual playground.” Ex. 1006, Abstract. This distinction is significant because, as described in the ’821 patent, the claimed physical playfield is a bounded physical playing space, which provides important safety benefits, whereas Cheok relates to play within an unbounded space with no restriction as to where the user may go. *See supra* Sections III.A, IV.

Indeed, Cheok never explains how to translate or scale the physical world to its virtual “Pac-World.” Cheok’s Figures 5 and 6 (below) purport to show a “correspondence between the physical world and the virtual Pac-world”:



Ex. 1006, Fig. 5 (annotated). Cheok states, “[a]s seen in Figure 5 where the 2D map of the selected game play area in our university campus [above, left] and the 3D map of Pac-World [above, right] are shown side-by-side, we have converted the real world to a fantasy virtual world while ingrained the latter with direct physical correspondences.” Ex. 1006, 5. Cheok further states that “there is a direct and real time link between the wide-area physical world and the virtual Pac-World at all times.” *Id.* But the virtual road in the virtual “Pac-World” (top right image above) does not have a corresponding road in the real world (top left image above). Instead, the road would run through a building (the Chinese Library) in the real world. This

would lead a user to walk into the building itself, an example of the precise type of problem the '821 patent sought to avoid through use of a physical playfield:



Ex. 1006, Fig. 5 (annotated). And Figure 6 shows that the game space includes roads with vehicles, creating a further safety hazard:

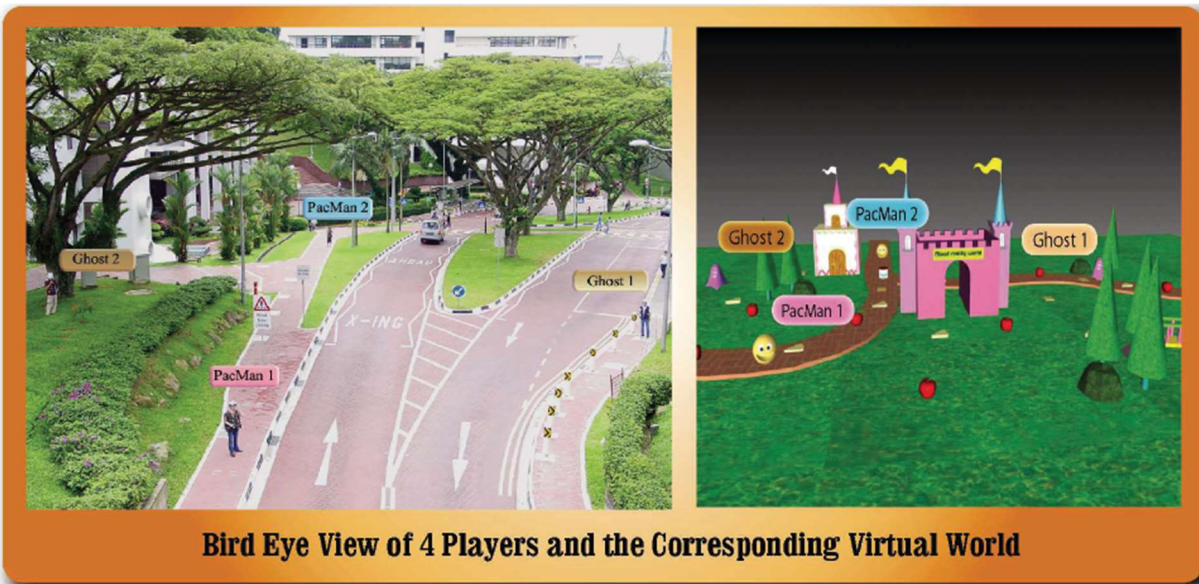


Figure 6. Correspondence between the physical world and the virtual Pac-world

Id., Fig. 6. As such, Cheok's lack of bounded play space presents a high safety risk, as players could bump into physical objects, such as buildings or vehicles. This is one of the key problems that the '821 Patent's physical playfield seeks to mitigate. *Supra* Section III.A. Moreover, unlike the '821 patent, Cheok's system does not allow for players in different physical locations to play together on the same virtual playfield.

Accordingly, Cheok's sensors do not "determine the physical location... *on a physical playfield*," as required by the challenged claims, because Cheok does not disclose a physical playfield.

The Petition does not rely on any other reference or any modification of Cheok in Grounds 1 and 3 for the claimed “physical playfield.” Pet., 21-22, 27-28, 42-44, 53-55. Thus, Grounds 1 and 3 fail.

2. Nakamura Fails To Disclose Or Render Obvious “A Physical Playfield” (Claims 1, 102) (Grounds 4, 5)

Similarly, Petitioner argues that Nakamura’s GPS unit is “a locating device operable to determine the physical location of said locating device on a physical playfield.” Pet., 57-58. Petitioner again incorrectly equates the unbounded “real world” with a “physical playfield.” *See id.*, 58 (“GPS is used to track a user’s movement through the real world (*on a physical playfield*).”).

Like Cheok, Nakamura makes no mention of any boundaries or dimensions of a play space. Rather, as relied on by the Petition, Nakamura generally discloses using GPS to track a user’s “movement through the real world.” Pet., 57-58; Ex. 1038, ¶ [0005]. This suggests that Nakamura’s system tracks a user’s global position in unbounded space, with no restriction on where a user may go, rather than a location in a bounded space. Nakamura simply states that when a new game is initialized, “the current location is obtained using the location acquisition function 11.” Ex. 1038, ¶ [0034]. Nakamura contains no disclosure that teaches or suggests establishing a bounded space for gameplay. Indeed, in some embodiments, Nakamura implies that the virtual world and the physical world may not correspond

at all. Nakamura states that “the user’s movements [in the virtual world] are not limited to representations reflecting the real world, such as maps. Instead, they can be reflected in virtual worlds that are further removed from reality.” *Id.*, ¶ [0008]. In this scenario, “the user’s movements and the controllable range in the virtual world may not align with their real-world range of movement.” *Id.* That is, because the virtual world does not reflect the real world, the user may encounter real-world obstacles, such as buildings or traffic, when attempting to navigate the virtual world. Nakamura attempts to frame this problem in a positive light, stating that “[t]his introduces an element of force majeure-like restriction, providing an additional way to enjoy the game.” *Id.* Apparently, Nakamura actually seeks out uses in which a user will run into a physical obstacle. Ex. 2012 (defining “force majeure” as “(1) superior or irresistible force; (2) an event or effect that cannot be reasonably anticipated or controlled”). But this “force majeure-like restriction” also presents a high safety risk, as players could bump into physical objects in the real world while attempting to navigate the virtual world. Thus, like Cheok, Nakamura’s lack of a bounded play space runs into the very same problem that the ’821 Patent’s physical playfield seeks to mitigate.

Accordingly, a POSITA would have understood that Nakamura does not disclose or render obvious “a physical playfield,” as required by the challenged claims, because it does not describe a physical playfield.

The Petition does not rely on any other reference or any modification of Nakamura in Grounds 4 and 5 for the claimed “physical playfield.” Pet, 57-58, 63-64, 78-79, 83. Thus, Grounds 4 and 5 fail.

B. Grounds 1 And 4 (Claim 1) Fail To Disclose Or Render Obvious “A Direction Of Gameplay Of Said Videogame Is Operable To Be Established By Recording A Manually Provided Direction In Response To A Prompt Requesting Said Manually Provided Direction”

Grounds 1 and 4 fail to disclose or render obvious “a direction of gameplay of said videogame is operable to be established by recording a manually provided direction in response to a prompt requesting said manually provided direction,” required by claim 1, the sole independent claim challenged in Grounds 1 and 4, from which the challenged dependent claims, 4, 11, 16, and 30 depend. Pet., 1. Thus, Grounds 1 and 4 fail.

The '821 patent explains that a “direction for gameplay” can be established before a new game or level begins. Ex. 1001, 15:63-16:13.

In FROGGER, for example, the origin may be near the boundary of the virtual playfield. Accordingly, the user may be prompted to select a direction for gameplay. Such a direction may be determined by the device prompting the user to point the device in a particular direction (where the direction the device is pointed in may be displayed to the user) and recording this direction.

Id., 15:67-16:13.

1. Ground 1: Cheok And Foxlin077 Fail To Disclose Or Render Obvious “Recording A Manually Provided Direction In Response To A Prompt Requesting Said Manually Provided Direction” To Establish “A Direction Of Gameplay”

Ground 1 relies on a combination of Cheok and Foxlin077 as allegedly rendering obvious the “direction of gameplay” limitation. Pet., 28-34. The Petition argues that Cheok establishes a direction of gameplay but concedes that it does not do so by “recording a manually provided direction in response to a prompt requesting said manually provided direction,” instead relying on combination with Foxlin077 for that functionality. *Id.*

The Petition points to Foxlin077’s “initialization steps” as allegedly disclosing this limitation. Pet., 30-32. The Petition argues “[t]he initialization steps ‘establish the rest position, from which orientation is measured and measure biases for the rate sensors,’ after which ‘the main operating steps 410 are performed.’ . . . A POSITA would have understood that in such a process, the user is establishing a reference orientation (*a direction of gameplay of said videogame is operable to be established*) by providing a manual orientation (e.g., by holding the sensor assembly stationary in a certain direction) (*by recording a manually provided direction*) in response to a message delivered to the apparatus (*in response to a prompt requesting said manually provided direction*).” *Id.*

But Foxlin077 fails to disclose or render obvious establishing a direction of gameplay by “recording a manually provided direction in response to a prompt requesting said manually provided direction” for several reasons.

First, Foxlin077 is directed only to a “sensor apparatus” and does not describe or suggest any application of the sensor for a video game. Therefore, Foxlin077 does not establish anything about a game, much less a direction of gameplay.

Second, even if Foxlin077 is or could be used in conjunction with a game, its initialization steps merely provide better physical measurement—they do not change the way Cheok allegedly establishes the direction of gameplay, converting it from one based on movement to one based on manual input. That is, the Petition’s argument is that Cheok establishes a direction of gameplay via the user’s movement (while admitting it does not do so with manual input, nor with manual input in response to a prompt requesting it). Pet., 28-29 (arguing that Cheok discloses a direction of gameplay by “establishing the direction/orientation of a user’s Ghost or Pacman virtual character based on the direction the user is facing on the field.”). Foxlin077’s initialization process only provides for *more accurate movement detection of that very same movement in Cheok*, by providing an initial configuration step to better measure physical movement. Pet., 36 (“Thus, in Cheok’s virtual/real environment ecosystem, a POSITA would have understood that Foxlin077’s manual reinitialization process would be beneficial to correct insufficiently addressed

accumulated drift.”). Even if Foxlin077’s initialization process was implemented in Cheek, it would not cause Cheek to establish a direction of gameplay with manual input. Thus, even in the combination, the establishment of a “direction of gameplay”, under Petitioner’s theory, is still done via movement of the user as he or she is playing the game, rather than by recording a manually provided direction in response to a prompt.

Third, Foxlin077’s baseline position—which is the alleged “manually provided direction”—is not manually provided. In Foxlin077, the system itself provides the alleged “direction” (which is an orientation according to the Petition) to the user, not the other way around. Foxlin077 states that “[i]nitialization must be conducted with the sensor assembly held stationary in a **known reference orientation**.” Ex. 1008, 10:29-31. “[T]he user is instructed 432 to place the sensor assembly in such a position by a message delivered to the apparatus input/output devices or implicitly by the fact of starting the tracker.” *Id.*, 10:31-35. Thus, in Foxlin077, the system provides a known reference orientation and instructs the user to hold the sensor in that orientation. The user simply carries out the system’s instructions, rather than manually providing the orientation. Thus, even if Foxlin077’s “reference orientation” constituted a direction, that direction would not be manually provided.

The Petition also argues that “Foxlin077 discloses that after initialization, *a direction of gameplay* may also be established in another way—during a reinitialization process.” Pet., 32. This is incorrect because, as recognized in the Petition, the reinitialization process simply repeats the same steps as the first initialization process. Pet., 33 (“the same initialization steps... are performed again.”). Thus, Foxlin077’s reinitialization process fails to disclose or render obvious this limitation for the same reasons as for the initialization steps. Moreover, the Petition fails to even allege that the reinitialization process occurs “in response to a prompt requesting said manually provided direction.” *Id.*

Fourth, there is no motivation to combine Cheok and Foxlin077, because a POSITA would have no reason to incorporate Foxlin077’s initialization steps into Cheok to establish a “direction of gameplay.” According to the Petition, Cheok teaches establishing a direction of gameplay by virtue of tracking a user’s head movement and orientation during gameplay. Pet., 28-29. There is no motivation to modify Cheok’s method for allegedly determining the direction of gameplay to include a prompt requesting a manually provided direction; it already allegedly determines direction by the user’s simple movement, which the user will already do while playing the game, a much more efficient process. Pet., 29-36.

The Petition first alleges that both Cheok and Foxlin077 use an “InertiaCube2” sensor. Pet., 34. But Foxlin077 says nothing about the InertiaCube2

sensor. And even if the references do use the same motion sensor, it is insufficient to establish a motivation to modify Cheok. Adding a prompt requesting manual user input for a direction of gameplay has drawbacks to user experience; it slows down the beginning of gameplay and complicates the overall system, removing the natural feel of playing without having to set up the game, when Cheok already works for its intended purpose. The authors of Cheok apparently designed and manufactured a real system, and chose not to incorporate prompts requesting manual user input before the user could start the game. The Petition concedes this when it cites that Cheok *already* “measures the displacement of the user from an initialization point by measuring the direction.” Pet., 34.

The Petition’s rationale regarding “drift” and sensor accuracy likewise does not establish a reason to prompt the user a manually provided direction. Pet., 35. For one, Cheok does not have an accuracy problem; indeed, it states that “head movement and orientation is tracked to high accuracy.” Pet., 29; Ex. 1006, 4. In fact, contrary to what the Petition implies, the quote relied on by the Petition explicitly states that it already addresses “sensor-tracking issues” and it leaves *other* issues unaddressed as exceeding the scope of the paper:

In Human Pacman, we tried to combine materials from *cognitive psychology and sociology* with that from computer science. However the vast amount of issues

encountered have exceeded the scope of this paper.
Therefore we *will concentrate on discussing sensor-tracking issues* with respect to Human Computer Interface design.

Ex. 1006, 10; Pet., 35. The Petition's selective quotation to imply that "Cheok suggests its sensors may have unaddressed tracking issues that 'exceed the scope of the paper'" is thus misleading and its conclusion is incorrect. Nor is Cheok's alleged discussion of GPS inaccuracy relevant; Foxlin077 has nothing to do with improving GPS accuracy. Ex. 1008, 6:22-23 ("The invention does not produce position information."). In addition, establishing a baseline for drift measurement does not establish a prompt for a manually provided direction of gameplay. They are simply unrelated concepts; the former has to do with accurately measuring movement; the latter asks a user to tell the system in what direction he or she is going to be playing.

Thus, the combination of Cheok and Foxlin077 fails to disclose or render obvious "a direction of gameplay of said videogame is operable to be established by recording a manually provided direction in response to a prompt requesting said manually provided direction."

2. Ground 4: Nakamura And Benini Fail To Disclose Or Render Obvious “Recording A Manually Provided Direction In Response To A Prompt Requesting Said Manually Provided Direction” In Order To Establish A Direction Of Gameplay

Ground 4 relies on a combination of Nakamura and Benini as allegedly rendering obvious the “direction of gameplay” limitation. Pet., 64-68. The Petition argues that Nakamura establishes a direction of gameplay but concedes that it does not do so by “recording a manually provided direction in response to a prompt requesting said manually provided direction.” Pet., 64-65. The Petition instead relies on combination with Benini for that functionality. *Id.*, 64-74.

Benini describes “exploring the potential of using portable devices in managing interaction in (semi)Immersive Virtual Reality (IVR) systems reconstructing cultural heritage objects and environments.” Ex. 1009, Abstract. Petitioner alleges that Benini discloses this limitation because it describes arrow buttons which “are used to turn around and to look up and down....” Pet., 68 (citing Ex. 1009, 4, Fig. 2). According to the Petition, the “arrows can be used to ‘change [the] camera’s position and orientation (interacting with the 2D map or with the arrows),’ thereby changing the view in the environment.” Pet., 68.

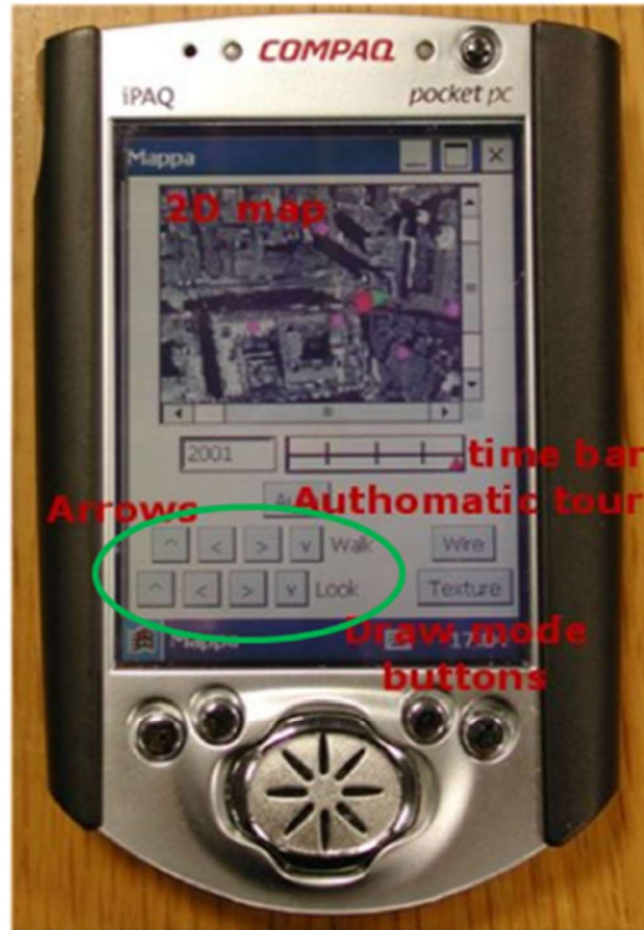


Figure 2: The User Interface developed for interacting via PDA with the Nu.M.E. VE

Pet., 68 (showing annotated Ex. 1009, Fig. 2).

In summary, Petitioner concludes that changing the orientation of a 2D map constitutes establishing a “direction of gameplay.” Pet., 68. Not so. **First**, there is no gameplay in Benini. Benini does not disclose a game of any sort; its purpose is to “reconstruct[] cultural heritage objects and environments” and allow users to view virtual heritage sites. Ex. 1009, Abstract. Thus, Benini does not disclose a “direction

of *gameplay of said videogame*.” Changing the angle of a 2D map or where a perspective is looking is not the same as the ’821 patent’s “direction of gameplay” because it is not setting a particular direction for a particular game, but rather simply allowing a user to change a perspective of the map. Thus, Benini does not disclose or render obvious “recording a manually provided direction in response to a prompt requesting said manually provided direction.”

Second, there is no reason to use Benini’s user interface features into Nakamura. Benini’s arrow buttons enable a user to “walk” and “look.” Ex. 1009, Fig. 2. That is, a user uses the arrows to navigate around Benini’s 2D map. But Nakamura already enables a user navigates the virtual world by moving in the real world. Ex. 1038, ¶ [0031]. Indeed, that a user navigates a virtual world by physically moving is Nakamura’s key feature:

[Solution] A game system (10) is provided that displays and controls the current location and displacement in the real world... as the virtual position and virtual displacement on the screen (virtual world) presented in a role-playing game.... As a result, it becomes possible to provide a system that, using location information, actualizes new entertainment by combining real location information with conventional game methods or entirely new game methods, while also enabling enjoyable physical activity as pedestrians physically move around.

Id., Abstract. The Petition claims that “Nakamura discloses a rotation feature... [but] does not disclose the specific processes for rotating the display of the virtual world.” Pet., 68-69. Not so. Nakamura plainly states that this functionality is performed using a direction sensor. Ex. 1038, ¶ [0017] (“[I]f the installed terminal is a device equipped with a direction sensor, it is possible to rotate the display of the virtual world....”). Accordingly, there is no reason to implement Benini’s “Walk” and “Look” arrow buttons into Nakamura’s system. Not only would this be redundant, slower, less user friendly, and require unnecessary user input, but it would actually subvert the entire purpose of Nakamura’s location and direction sensing features.

In short, Benini’s arrow keys are simply incompatible with Nakamura’s location-based gameplay. To the extent the Petition is arguing that there is no disclosure regarding how to actually move the image on the screen in Nakamura, that is not, and is not alleged to be, provided by Benini. Rather, what is relied on in Benini is a detection of which direction the user wants to move the map by a user pressing a button corresponding to the direction desired to rotate the 2D map. But Nakamura already discloses automatically detecting this direction by measuring a user’s physical movements. There is no reason to substitute in Benini’s buttons for Nakamura’s automatic detection. Moreover, the movement of the screen image in Nakamura and Benini is not analogous—Nakamura rotates the orientation of the

same virtually-created image so that the character always moves in the “up” direction on the screen, while Benini moves a real-world map image to actually view and explore *different parts* of heritage sites to see something different and new. Thus, for many reasons, there is no motivation to combine Nakamura and Benini as suggested by the Petition.

Thus, the combination of Nakamura and Benini fails to disclose or render obvious “a direction of gameplay of said videogame is operable to be established by recording a manually provided direction in response to a prompt requesting said manually provided direction.”

C. Ground 1 (Claim 1): Cheok Fails To Disclose Or Render Obvious “A Display” And “A Virtual Character” Wherein “Said Virtual Character Is Displayed On Said Display”

Ground 1 suffers from an additional defect. The Petition exclusively relies on Cheok for the claim limitations of “a display” and “a virtual character” wherein “said virtual character is displayed on said display,” but Cheok fails to disclose or render obvious those features.

The Petition alleges the “display” of claim 1 is “the Cy-Visor Head Mounted Display,” also called the “HMD.” Pet., 20. The Petition alleges that “Pacmen and Ghosts” constitute the claimed “virtual character.” Pet., 25. However, the Petition then argues that the virtual character is displayed “in the virtual world (i.e., Pac-

world) view,” and annotates Figure 10 of Cheek to identify the claimed display on which the virtual character is allegedly displayed:



Figure 10: Sequence of pictures showing the collection of an ingredient

Pet., 26 (annotation in original). But the Petition thus points to two different things for “a display” and “said display.” First it points to the HMD as “a display” but then as to where the “virtual character” is displayed, it conspicuously does not annotate the “View Inside HMD” portion of Figure 10, because the “View Inside HMD” would not satisfy the claims. *Id.* Instead, the Petition cites a “Pac-World View”

displayed on a computer, with no evidence or citation stating that that Pac-World View is displayed in the HMD:



Figure 8. Close collaboration between the outdoor Pacman and her Helper

Ex. 1006, Fig. 8 (annotated) (showing alleged virtual character in 3-D Pac-World View only in desktop computer), 4 (“Similarly the point-of-view of each mobile player is sent to the computer of a helper through the server, and the corresponding view in the virtual Pac-World can be displayed.”).

Thus, Ground 1 additionally fails to disclose or render obvious that “said virtual character is displayed on said display.”

D. Grounds 3 And 5 (Claim 102) Fail To Disclose Or Render Obvious “An Origin Of Gameplay Of Said Video Game Is Operable To Be Established By Recording A Manually Provided Origin In Response To A Prompt Requesting Said Manually Provided Origin”

Grounds 3 and 5 fail to disclose or render obvious “an origin of gameplay of said video game is operable to be established by recording a manually provided origin in response to a prompt requesting said manually provided origin,” as recited in Claim 102.

As explained in the '821 patent, the origin of gameplay is a location in the physical world. “To initiate a location-based game, a user may be prompted to set an origin for the game [through] a Graphical User Interface (GUI).” Ex. 1001, 6:15-17. “Such a functionality may allow a user to locate a proper spot on an actual, physical playfield before gameplay begins or to allow a video game to establish a reference location.” *Id.*, 6:20-23. The origin location is also used as a reference location by the system’s location sensors to control a virtual character’s movement within the virtual world. *Id.*, 7:10-15 (“[T]he difference in two locations provided by a locating device (e.g., the magnitude and direction of a location to an origin) may be utilized to move a character in a video game playfield (or provide other control signals to the video game system).”). Thus, a POSITA would have

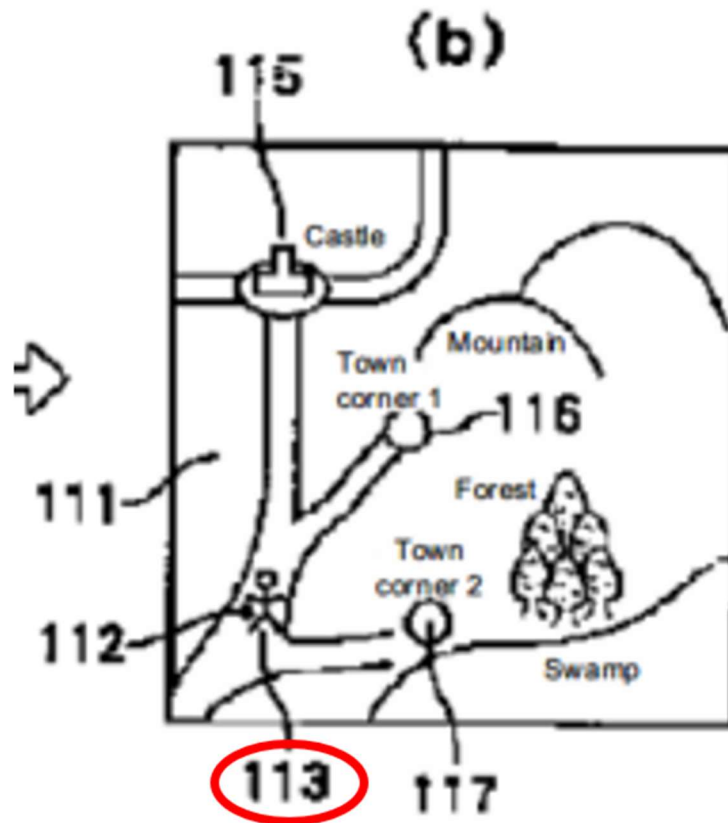
understood that the “origin of gameplay” means where the user physically is located, not a virtual location of a virtual character. *See also id.*, 9:1-3 (“Step 207 may then wait for a user to submit the origin (e.g., for a user to *select a physical location as the start of a game.*”); Fig. 4 (“pressing OK will mark *your current location as pacman’s origin* in the maze”); Fig. 14 (“determine magnitude between origin and current location”). Importantly, establishing an origin physical location enables the system to “use this location as a reference location during gameplay.” *Id.*, 9:25-31. “Multiple features may be provided as the result of including... one or more reference/origin values,” including “a multiplayer feature where the players may be located on different physical playfields.” *Id.*, 9:31-35. Establishing a physical origin also ensures that a user is in a physical location that is suitable to begin the game. *See id.*, Fig. 4 (prompt notifies the user that “[y]ou will need an open area of 200 feet x 200 feet to play the game”).

1. Grounds 3 And 5: Nakamura Fails To Disclose Or Render Obvious Establishing An Origin Of Gameplay “By Recording A Manually Provided Origin In Response To A Prompt Requesting Said Manually Provided Origin” (Grounds 3, 5)

In Ground 5, Petitioner argues that Nakamura renders obvious “an origin of gameplay of said videogames is operable to be established by recording a manually

provided origin in response to a prompt requesting said manually provided origin.”
Pet., 81. Petitioner is incorrect.

The Petition points to Nakamura’s disclosure of a user having the ability to move “position icon 113” as manually providing an origin of gameplay. Pet., 80-81 (citing that “position icon 113, or position display icon, can be arranged according to the user’s preference” and arguing that “[t]he display of a movable position icon is a *prompt requesting said manually provided origin* because it indicates to a user that the user should either change the initial position setting or confirm that the current position is correct.”) (citing Ex. 1007, ¶¶ [0035]-[0036]). However, unlike the ’821 patent’s physical “origin of gameplay,” Nakamura’s position icon 113 represents a virtual character’s ***virtual location*** in the virtual world, rather than a user’s physical location. This initial virtual position has no relationship to the physical location; it can be moved freely in the virtual world. See Ex. 1038 ¶ [0036] (“the position icon 113 is displayed at a virtual position that is appropriate to be set as the initial position”), ¶ [0038]. The reference even alternatively calls it “virtual position 113.” *Id.* As shown below, Nakamura’s Figure 9(b) shows position icon 113 on a map of the virtual world:

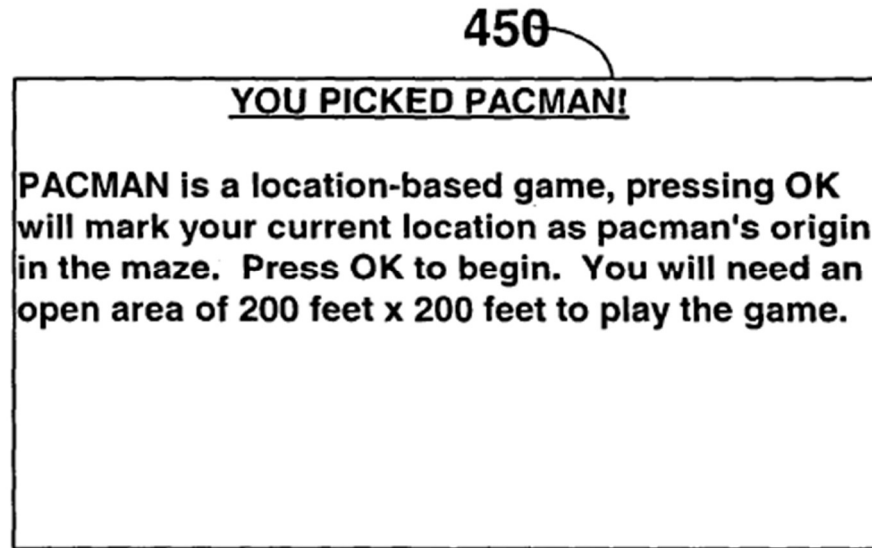


Ex. 1038, Fig. 9(b); *see also id.*, ¶ [0035] (“[A]s shown in Figure 9(b), the function 31 for displaying the virtual world displays the first screen (the first virtual world) 111 of the role-playing game.”).

As explained above, establishing a physical origin of gameplay is critical to key features of the patented system. *See supra* Sections III.A, VI.D. For example, establishing a physical origin location enables the system to “use this location as a reference location during gameplay.” *Id.*, 9:25-31. Moreover, providing a prompt requesting a manual physical origin allows the system to inform the user “how much

free physical space is needed on all sides of the origin for gameplay.” *Id.*, 6:18-20.

Screen 450 of Figure 4 illustrates such a prompt:



Id., Fig. 4 (partial). By contrast, Nakamura’s initial virtual location setting can do none of that. Because Nakamura only discloses setting a virtual character’s virtual position, it may start a game even if a user is in an unsuitable physical location (e.g., a small room for a game that requires a 200 foot playfield).

Thus, at most, Nakamura’s description of moving the position icon 113 as discloses establishing an initial *virtual* location. In contrast, the ’821 patent’s system “prompt[s] a user to position the device at a desired origin” and “wait[s] for a user to submit the origin (e.g., for a user to select a physical location as the start of a game).” Ex. 1001, 8:66-9:3. Accordingly, Nakamura does not disclose or render obvious establishing an “origin of gameplay,” as recited in claim 102.

Thus, Grounds 3 and 5 fail to disclose or render obvious “an origin of gameplay of said videogames is operable to be established by recording a manually provided origin in response to a prompt requesting said manually provided origin,” as recited in Claim 102.

2. Ground 3: The Petition Concedes That Cheok Fails To Disclose Establishing An Origin Of Gameplay “By Recording A Manually Provided Origin In Response To A Prompt Requesting Said Manually Provided Origin”

For Ground 3, the Petition asserts that Cheok in view of Nakamura renders obvious the “origin of gameplay” limitation. Petitioner concedes that “Cheok does not explicitly disclose that the initialization point is *operable to be established by recording a manually provided origin in response to a prompt requesting said manually provided origin.*” Pet., 44-45. But, as explained above, Nakamura similarly fails to teach or suggest this feature.

Moreover, contrary to Petitioner’s arguments, a POSITA would not have been “motivated to rely on Nakamura’s initialization features to enhance Cheok’s Human Pacman system.” Pet., 48. The Petition argues that because Cheok discloses a system that tracks user movement and discusses measuring such user movement from “an initialization point,” it would benefit from incorporating Nakamura’s alleged manual origin location setting. *Id.* That is wrong for at least two reasons.

First, the Petition’s theory is that because Cheok uses a physical reference point to measure a user’s physical movement, it would benefit from Nakamura’s manual input for setting such a reference point. Pet., 48. For example, the Petition relies on Cheok’s statement that “[t]he DRM [Dead-Reckoning Modules] measures the displacement of the user from an initialization point by measuring the direction (with data obtained from the compass), and distance traveled (using accelerometer data) with each footstep taken.” Pet., 44 (citing Ex. 1006, 106). The Petition then theorizes that because “Cheok does not disclose the specific processes for an initialization step to set an initial location reference,” “[a] POSITA would have thus found it beneficial to implement Cheok based on Nakamura’s teachings of an initialization step wherein a player uses the display interface to manually input an initialization point.” Thus, the Petition argues that a POSITA would incorporate Nakamura’s process for using a manual input to set a physical, real world initialization point, from which Cheok could then measure location, direction, distance, etc., that the user has traveled in the real world. Pet., 48. But Nakamura does not disclose manually setting a *physical* initialization point in the real world. As explained above in Section VI.D.1, Nakamura only discloses setting an initial *virtual* position via manual input. Nothing about that virtual position could be used to detect direction, distance traveled, etc., by the actual user’s physical movements. Thus, there is no motivation to combine.

Second, Cheok states that in Human Pacman, the players’ initial virtual locations are predetermined: “3.3 Actual Gameplay. Starting the game: Pacmen and Ghosts start from the Pac-castle and Ghost-house in Pac-world respectively. These two places correspond to two different physical locations in the game area.” Ex. 1006, 7. Thus, no reason exists to implement Nakamura’s initial virtual location setting in Cheok, since a player in Cheok does not have an option of where to start in the virtual world. In fact, it would directly conflict with the operation of Cheok if users were allowed to manually move virtual character origin location in the virtual game world. Characters *must* start in dedicated, predetermined locations. They *cannot* be moved. Thus, for another independent reason, there is no motivation to combine.

Thus, Ground 3 fails to disclose or render obvious “an origin of gameplay of said videogames is operable to be established by recording a manually provided origin in response to a prompt requesting said manually provided origin,” as recited in Claim 102.

E. Grounds 3 And 5 (Claim 102) Fail To Disclose Or Render Obvious “A Virtual Character... Facing A Virtual Direction . . . And Said Virtual Direction On Said Virtual Playfield Corresponds To Said Physical Direction On Said Physical Playfield”

In Grounds 3 and 5, the Petition improperly refers up from its claim 102[d] analysis to its claim 1 analysis and ignores differences in the claims that result in the

Petition failing to explain its theory as to claim 102. Pet., 43-44, 79 (referring up to 1[a.3]). Even if the Board were to read an allegation into the Petition, the references fail on the merits to disclose or render obvious the claimed “virtual character... facing a virtual direction... and said virtual direction on said virtual playfield corresponds to said physical direction on said physical playfield.” Grounds 3 and 5 thus fail.

1. Ground 3 Fails To Disclose Or Render Obvious “A Virtual Character... Facing A Virtual Direction . . . And Said Virtual Direction On Said Virtual Playfield Corresponds To Said Physical Direction On Said Physical Playfield”

a. The Petition Contains No Allegation Regarding A Virtual Character Facing A Virtual Direction

With respect to limitation 102[d] in Ground 3, the Petition asserts that “Cheok discloses a processor coupled to said display and said locating device, wherein said processor is operable to provide a video game comprising *a virtual character* with a virtual location and *facing a virtual direction* on a virtual playfield said virtual location on said virtual playfield corresponds to said physical location on said physical playfield *for the same reasons as discussed for Ground 1, limitation 1[a.3]*, which recites substantially similar limitations.” Pet., 43-44. The Petition does not rely on any reference besides Cheok for this element. *Id.* Nor does the Petition provide any additional analysis for this element. *Id.*

But claim 102 contains multiple requirements not present in claim 1, and the Petition completely fails to address them. Specifically, limitation 1[a.3] does not require a virtual character to face a virtual direction on a virtual playfield, which is required in 102[d], as highlighted below:

Limitation 1[a.3]	Limitation 102[d]
a processor coupled to said display and said locating device, wherein said processor is operable to provide a video game comprising a virtual character with a virtual location on a virtual playfield, said virtual character is displayed on said display, said virtual location on said virtual playfield corresponds to said physical location on said physical playfield...	a processor coupled to said display and said locating device, wherein said processor is operable to provide a video game comprising a virtual character with a virtual location <i>and facing a virtual direction on a virtual playfield</i> said virtual location on said virtual playfield corresponds to said physical location on said physical playfield... <i>and said virtual direction on said virtual playfield corresponds to said physical direction on said physical playfield.</i>

Thus, the Petition fails to set forth any argument or evidence that Cheok discloses or renders obvious a virtual character “facing a virtual direction on a virtual playfield,” as recited in claim 102. This is fatal to Ground 3, as the Petition fails to allege how each element of claim 102 is met and thus does not comply with 37 C.F.R. § 42.104(b)(4). *See* 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art.”); *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) (petitioner failed to satisfy its burden of proving obviousness where petitioner “merely argued in conclusory fashion that the same analysis” applied for different grounds). While the Petition arguably suggests that Cheok discloses “a direction of gameplay” (*see* Pet., 29), “a direction of gameplay” is not the same as “a virtual character... facing a virtual direction,” because a “direction of gameplay” is not as specific as “a virtual character... facing a virtual direction.” Nor does one imply or render obvious the other. Regardless, the Petition simply contains no allegation, and any allegation now would constitute impermissible new argument about a claim limitation, the analysis of which is simply not present in the Petition, which is fatal to Ground 3. *See* 35 U.S.C. § 312(a)(3) (“A petition... may be considered only if... (3) [it] identifies, in writing and with particularity,... the evidence that supports the ground **for the challenge to each claim**....”); 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art.”); *Netflix, Inc. v. DivX, LLC*, 84 F.4th

1371, 1377 (Fed. Cir. 2023) (“[T]he Board should [] not have to decode a petition to locate additional arguments beyond the ones clearly made.”); *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369-70 (Fed. Cir. 2016) (affirming Board’s refusal to consider new theory of invalidity not presented in initial petition).

b. Cheok Fails To Disclose Or Render Obvious A Virtual Character Facing A Virtual Direction Wherein Said Virtual Direction On Said Virtual Playfield Corresponds To Said Physical Direction On Said Physical Playfield

Moreover, even if the Board were to find a sufficient allegation regarding a virtual character facing a virtual direction in the Petition as to Cheok, the Petition fails to show that any such virtual direction corresponds to the physical direction of the directional device on the physical playfield, as required by claim 102 Ex. 1001, Claim 102 (“a virtual character . . . facing a virtual direction . . . and said virtual direction on said virtual playfield corresponds to said physical direction on said physical playfield”).

The Petition argues that the system of Cheok “establish[es] the direction/orientation of a user’s Ghost or Pacman virtual character based on the direction the user is facing on the physical field.” Pet., 29. But Cheok does not contain such functionality. The Petition cites Cheok’s statement that “the point-of-*view* of each mobile player is sent to the computer of a helper through the server, and the corresponding *view* in the virtual Pac-World can be displayed.” *Id.* But that

simply states that the view the user sees is duplicated in the 3-D Pac-World that is displayed on the computer, as depicted below:

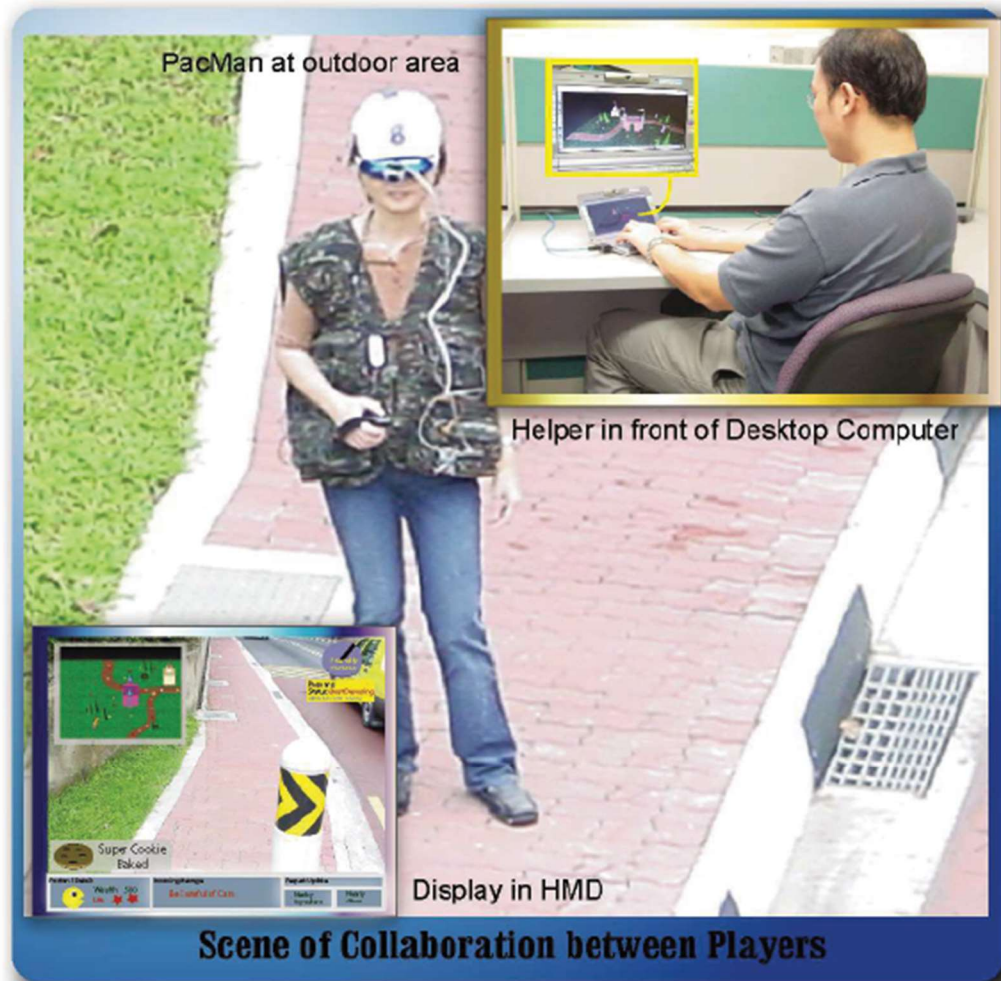


Figure 8. Close collaboration between the outdoor Pacman and her Helper

Ex. 1006, Fig. 8. And while the reference discusses updating the “position of other mobile players obtained from the server,” there is no evidence of a virtual direction

of a virtual character in the virtual world corresponding to the “physical direction on said physical playfield.”

Ground 3 thus fails.

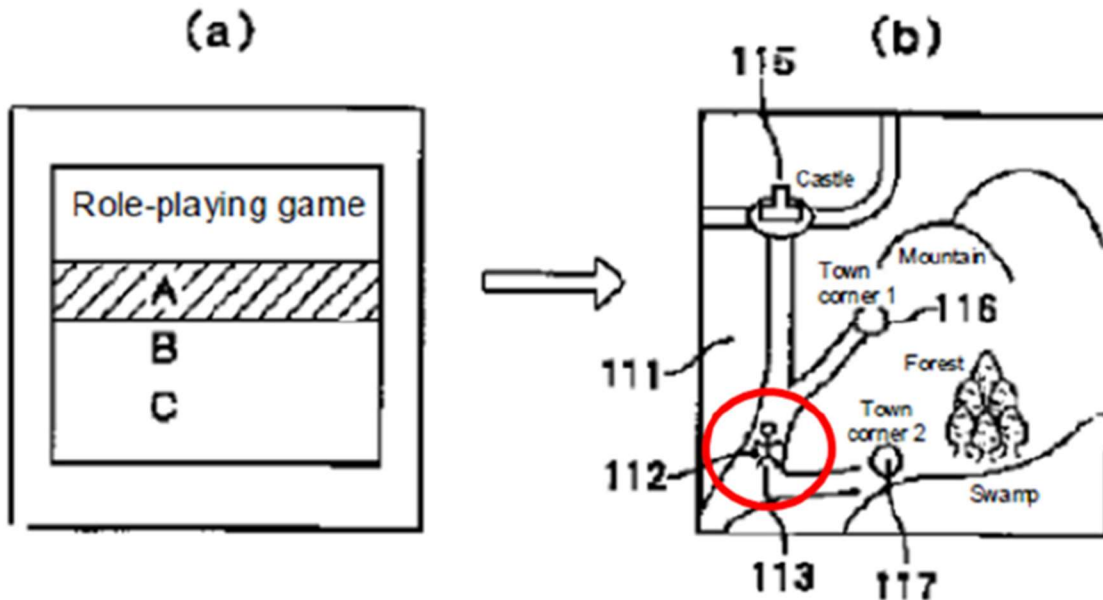
2. Ground 5 Fails To Disclose Or Render Obvious “A Virtual Character... Facing A Virtual Direction . . . And Said Virtual Direction On Said Virtual Playfield Corresponds To Said Physical Direction On Said Physical Playfield”

The Petition asserts that “Nakamura discloses a processor coupled to said display and said locating device, wherein said processor is operable to provide a video game comprising *a virtual character* with a virtual location and *facing a virtual direction* on a virtual playfield said virtual location on said virtual playfield corresponds to said physical location on said physical playfield *for the same reasons as discussed for Ground 1, limitation 1[a.3]*, which recites substantially similar limitations.” Pet., 79. The Petition does not rely on any reference besides Nakamura for this element. *Id.* Nor does the Petition provide any additional analysis for this element. *Id.*

As with Ground 3, the Petition fails to set forth any argument or evidence that Nakamura discloses or renders obvious a virtual character “facing a virtual direction on a virtual playfield,” as recited in Claim 102, as it purely refers up to a claim that does not have that requirement. Thus, Ground 5 fails. *Magnum Oil*, 829 F.3d at 1380; *Netflix*, 84 F.4th at 1377; *Intelligent Bio-Sys.*, 821 F.3d 1359, 1369-70.

Even if the Board were to consider new argument that is lacking in the Petition, which it should not, Nakamura fails to disclose or render obvious the claim limitation because the alleged virtual character in Nakamura does not “face” any direction. Nor does the Petition identify or argue what direction the virtual character faces; the Petition is simply lacking any argument on this claim limitation. Pet., 79. The Petition only refers up to limitation 1[a.3], wherein the Petition argues that “Nakamura discloses a *virtual character* that is position icon in the form of a human figure or face,” pointing to position icon 113 and stating that “Figures 9 through 13 below show position icon 113 representing a human figure displayed on the mobile terminal’s during gameplay.” Pet., 60. But Nakamura’s “position icon 113” is never described or illustrated as facing any specific direction in the virtual world, nor is any allegation regarding what direction it is facing even made in the Petition. Pet., 60, 79. Position icon 113 is simply a stick figure icon on a 2D map that does not face any direction.

[Fig. 9]



Pet., 61 (annotation in original); Ex. 1007, Figs. 9-13. Thus, Nakamura fails to disclose or render obvious “a virtual character... facing a virtual direction.”

Moreover, there is no discussion or even an allegation in the Petition that any “virtual direction” that the stick-figure character 113 might be “facing” in any way “corresponds to said physical direction [of the claimed locating device] on said physical playfield.” Pet., 79. The Petition argues that “Nakamura discloses a feature in which the virtual world display is rotated such that the direction of virtual displacement in the virtual world (*said virtual direction on said virtual playfield*) is aligned with (*corresponds to*) the direction of real displacement in the real world.”

Pet., 83 (citing Ex. 1007, ¶¶ [0017], [0024]). But this merely states that, according to Petitioner, “the virtual world *display* is rotated”—it does not amount to an allegation of, much less evidence of, a virtual character (alleged in the Petition to be the stick figure 113 in Nakamura, as explained above) facing a direction that “corresponds to said physical direction [of the claimed locating device] on said physical playfield.” The whole display is rotated, and so to the extent the virtual character is “facing” any way in its virtual world (which it is not, as it is simply a stick-figure representation), that alleged direction does not change by rotating the whole virtual world.

Ground 5 thus fails.

VII. Conclusion

For any or all of the above-described reasons, Patent Owner respectfully requests that the Board deny institution.

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Respectfully submitted,

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CERTIFICATE OF WORD COUNT

The undersigned certifies that the portions of the above-captioned PATENT OWNER'S PRELIMINARY RESPONSE specified in 37 C.F.R. § 42.24 have 11,599 words, in compliance with the 14,000 word limit set forth in 37 C.F.R. § 42.24(b)(1). This word count was prepared by the word-processing program used to prepare this paper (Microsoft Word).

Dated: July 18, 2025

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CERTIFICATE OF SERVICE

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