

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SONY INTERACTIVE ENTERTAINMENT LLC
Petitioner,

v.

QUANTUM IMAGING LLC
Patent Owner.

Patent No. 8,458,028

Inter Partes Review No. IPR2023-00954

SUPPLEMENTAL DECLARATION OF MR. DAVID CRANE

Petitioner's Exhibit List

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I. INTRODUCTION

1. I have been retained by counsel for Sony Interactive Entertainment LLC (“Sony” or “Petitioner”) in connection with the proceeding identified above. I submit this supplemental declaration in support of Sony’s Petition for *Inter Partes* Review of United States Patent No. 8,458,028 (“Petition”). I understand that Quantum Imaging LLC (“Patent Owner”) states that it is the owner of U.S. Patent No. 8,458,028 (Ex. 1001, “the ’028 Patent”).

2. I submitted a declaration (Ex. 1004) dated May 23, 2023, in connection with Sony’s Petition. That declaration included my opinions regarding how a person of ordinary skill in the art (“POSITA”) would have understood the ’028 Patent at the time of invention, and my opinions regarding whether the prior art references used in the asserted grounds of the Petition disclose elements of the claims challenged in that petition.

3. I understand that the Petition challenged claims 1 and 3-9 of the ’028 Patent. I understand further that, after the Petition was filed, the Patent Trial and Appeal Board (“Board”) issued a decision on institution (Paper No. 11, “DI”) that instituted trial for the challenged claims. I understand that, after the Board instituted trial, Patent Owner filed a Patent Owner’s Response (“Response”) in this proceeding (Paper No. 23).

4. I am being paid \$500 per hour for my work on this matter. My compensation is not dependent on the outcome of this *inter partes* review and in no way affects the substance of my statements in this declaration.

II. QUALIFICATIONS

5. I provided details of my qualifications, and a copy of my CV (Ex. 1005), in connection with my first declaration (Ex. 1004). For conciseness, I will not repeat them here.

III. MATERIALS REVIEWED AND CONSIDERED

6. In performing my analysis and preparing this supplemental declaration, I reviewed the Petition and the cited exhibits; the Response; and the Board's decision on institution, in addition to the '028 Patent (Ex. 1001) and its prosecution history (Ex. 1003). I also reviewed portions of Dr. Medvidovic's textbook, *Software Architecture: Foundations, Theory, and Practice* (Ex. 1018); portions of the Microsoft Computer Dictionary, Fifth Edition (Ex. 1017); and portions of Merriam-Webster's Collegiate Dictionary, 10th Edition (Ex. 1024); and any other documents referenced herein. In addition to the above exhibits and other documents, my opinions herein are based upon my personal knowledge, professional judgment, education, and experience gained through my years as a practitioner in the field.

IV. LEGAL UNDERSTANDING

7. I have been advised and understand that a POSITA is presumed to be aware of all pertinent art, thinks along conventional wisdom in the art, and is a person of ordinary creativity, not an automaton. With this understanding, a POSITA at the time of the invention claimed in the '028 patent would have had a bachelor degree in computer engineering, computer science, or a similar discipline, and/or two years of professional experience in the fields of networking and network-based systems or applications, such as client-server and web-based systems, in the specific context of console and gaming or an equivalent level of skill, knowledge, and experience. A POSITA would have at least a general knowledge of online and in-game advertising methods prevalent in the field, as well as at least a general knowledge of 3D rendering and virtual reality. This is the same definition of the POSITA that I provided and applied in my first declaration. (Ex. 1004, 43.)

V. ANALYSIS

A. “Game Application”

8. I understand that the words of a claim are generally given the ordinary and customary meaning that the term or phrase would have to a POSITA at the time of the invention in view of the surrounding claim language in the specification and the prosecution history. (Ex. 1004, 61.) I also understand that courts may consider extrinsic evidence, such as expert and inventor testimony, dictionaries,

and learned treatises (collectively, the “extrinsic evidence” or the “extrinsic record”), but that such extrinsic evidence should be given less weight than the intrinsic evidence. (Ex. 1004, 62.)

9. I consulted the Microsoft Computer Dictionary, Fifth Edition (Ex. 1017), regarding the meaning of the term “game application.” The phrase “Game application” does not expressly appear in the Microsoft Computer Dictionary, or in any other dictionary that I consulted. However, the Microsoft Computer Dictionary provides the following definition for “application”: *A program designed to assist in the performance of a specific task, such as word processing, accounting, or inventory management.* (Ex. 1017, 31.)

10. In my view, the Microsoft Computer Dictionary definition of “application” is consistent with the ordinary and customary meaning, to the POSITA at the time of the invention, of the term “game application” in the ’028 patent. Specifically, the POSITA would have understood a game application to mean: *a program designed to assist in the performance of a game.* A game is a type of specific task, akin as the examples of word processing, accounting, or inventory management provided in the dictionary. (Ex. 1017, 31.) I further believe this meaning of “game application” to be consistent with its usage in the claims, specification, and prosecution history of the ’028 patent.

B. TerraZones Storyboard

11. The prosecution history of the '028 patent includes what the patent applicant described as the “TerraZones storyboard.” (Ex. 1003, 107-08, 122-31, 279-80, 293-302.) For example, in appeal briefs dated March 12, 2009 and March 25, 2011, the patent applicant specifically referred to the TerraZones storyboard; provided “the pertinent portion” of the TerraZones storyboard in an evidence appendix; and described the TerraZones storyboard as a “storyboard example of the invention.” (Ex. 1003, 107-08, 122-31, 279-80, 293-302.)

12. For the reasons described below, the POSITA would understand this portion of the prosecution history to be consistent with a web browser meeting the limitation *locally executed game application that is accessible at said primary electronic device* that appears in claim 1 of the '028 patent. I believe the POSITA would understand this portion of the prosecution history to be inconsistent with what I’m informed is the Patent Owner’s position that a web browser cannot meet that limitation.

13. In the prosecution history, the applicant twice provided what it described as “a copy of the pertinent portion” of the TerraZones storyboard in an evidence appendix. Pages 122-131 of the prosecution history show this evidence appendix. (Ex. 1003, 107-08, 122-31.) The applicant also indicated that the

TerraZones storyboard had previously been provided to the patent examiner during a personal interview of October 8, 2008. (Ex. 1003, 107-08.)

14. The evidence appendix available in the prosecution history is of poor visual quality, reflecting what I understand to be a black-and-white photocopy of an original document provided by the patent applicant. (Ex. 1003, 122-31.)

However, despite the poor image quality, key details are apparent as described below.

15. I am informed that in the co-pending district court litigation Patent Owner produced a document marked as bates number BT00014843-BT00014878. (Ex. 1020.) Portions of Ex. 1020 clearly correspond to the “pertinent portion” of the TerraZones storyboard provided in the prosecution history, but are provided in color and at a higher visual quality. For example, based on a visual comparison, pages 123-131 of Ex. 1003 clearly correspond to pages BT00014845-853 of Ex. 1020. I thus believe Ex. 1020 to be the original document from which the “copy of the pertinent portion” of the TerraZones storyboard was derived. I also believe Ex. 1020 to likely be the document that the applicant provided to the patent examiner in the October 8, 2008 interview. (Ex. 1003, 107.) If any elements of the TerraZones storyboard from the prosecution history (Ex. 1003, 123-131) were unclear, I compared them against the original version in Ex. 1020 to resolve any ambiguity.

16. The POSITA would understand that the TerraZones storyboard illustrates the application Microsoft Internet Explorer, which was a popular web browser that was in widespread use by October 16, 2002. This can be seen in at least pages 123-24 of the prosecution history. (Ex. 1003, 123-24; Ex. 1020, BT00014843-846.) This page provides a screen capture of the Microsoft Internet Explorer web browser, evident from the text “Microsoft Internet Explorer provided by Compaq” in the title bar of the web browser. (*Id.*) Further, I am personally familiar with Microsoft Internet Explorer, having used that computer application prior to October 16, 2002, and I recognize this screen capture as a representation of that application. I further recognize the screen capture as showing Microsoft Internet Explorer as an application being executed on the Windows operating system, recognizable at least from the Windows “Start” icon in the lower left. (*Id.*) The POSITA would likewise have been personally familiar with Microsoft Internet Explorer and the Windows operating system for PCs, as those products were ubiquitous among computer users by 2002.

17. As the POSITA would have recognized, Microsoft Internet Explorer, as depicted in the TerraZones storyboard, is one example of the web browsers in use before 2002. By 2002, web browsers such as Microsoft Internet Explorer included plug-ins such as Shockwave and Flash, which were used to play games. A POSITA would understand the “game application” in the ’028 patent to

encompass web browsers, at least because the TerraZones storyboard refers to Microsoft Internet Explorer as an example of the invention. (Ex. 1003, 107-131.)

18. As I know from my personal knowledge of Microsoft Internet Explorer, and as the POSITA would recognize, Microsoft Internet Explorer was an application that was executed on an electronic device, such as a user's personal computer. This is corroborated by the title bar shown on pages 123-24 of the prosecution history: the Microsoft Internet Explorer web browser is "provided by Compaq." (Ex. 1003, 123-24; Ex. 1020, BT00014843-846.) Compaq was a manufacturer of Windows-based PCs by at least 2002, and this language from the title bar indicates to the POSITA that this version of Microsoft Internet Explorer was provided by Compaq for execution on a Compaq PC.

19. The TerraZones storyboard indicates that the Microsoft Internet Explorer web browser shows a "website," labeled "Game Zone," from which the "visitor chooses game/genre." (Ex. 1003, 123; Ex. 1020, BT00014845.) The storyboard shows the web browser presenting various games/genres for selection by the user. For example, the web browser has links for "Mystery" ("Cronos"); "Adventure"; "Sports"; "Sci-Fi"; and "Education." (*Id.*) The POSITA would understand these to be examples of games/genres that the visitor can select and play. The link for Mystery (Cronos) is highlighted, indicating that the user may be

in the process of selecting that link. An alien figure is visible in the Mystery (Cronos) link.

20. Page 124 of the TerraZones storyboard again shows a screen capture of the Microsoft Internet Explorer web browser. (Ex. 1003, 124; Ex. 1020, BT00014846.) The web browser prompts the user to select either a mouse or a joystick. (*Id.*) The POSITA would understand this to teach the web browser prompting the user to select an input mode for a game (*e.g.*, Cronos).

21. Page 125 of the TerraZones storyboard includes the text “Cronos Demo,” indicating that the user has selected the Mystery (Cronos) link from the web browser. (Ex. 1003, 125; Ex. 1020, BT00014847.) The slide indicates that the “entire game integrates 2D/3D/video/web interaction,” and that “Gamer’s POV (1st point of view)” is shown. (*Id.*)

22. The POSITA would understand page 125 to be a depiction of a game (Cronos) presented via the Microsoft Internet Explorer web browser. Even though page 125 does not expressly include the Microsoft Internet Explorer title bar seen in pages 123 and 124, the POSITA would understand this to be an illustration of the same web browser seen on those pages. This is at least because page 125 includes the same image (Boston North Church) shown in the web browser screen capture on page 124; page 125 includes the same game (Cronos) and alien character shown in the web browser screen capture; and page 125 indicates that the

“entire game integrates 2D/3D/video/web interaction,” which as the POSITA understood were functions provided by web browsers such as Microsoft Internet Explorer in 2002. (Ex. 1003, 123-25; Ex. 1020, BT00014845-47.)

23. Similarly, and for analogous reasons, the POSITA would understand the remaining slides (126-131) of the TerraZones storyboard to illustrate a game (*i.e.*, Cronos) being presented via the Microsoft Internet Explorer web browser. (Ex. 1003, 123-25; Ex. 1020, BT00014848-53.)

24. The color version of the storyboard (Ex. 1020) includes additional various additional slides (BT00014843-44, BT00014854-78) that are not in the portion of the TerraZones storyboard provided in the prosecution history. These slides further corroborate the POSITA’s understanding of the TerraZones storyboard described above. (Ex. 1020, BT00014843-44, BT00014854-78.)

25. It is my view that the POSITA would have understood the Microsoft Internet Explorer web browser, as depicted in the TerraZones storyboard, to be an example of a locally executed game application. (Ex. 1003, 123-24; Ex. 1020, BT00014843-46.) This is at least the TerraZones storyboard refers to Microsoft Internet Explorer as an example of the invention. (Ex. 1003, 107-131.)

26. The web browser, as depicted in the TerraZones storyboard, is consistent with the definition of “game application” provided above, *e.g.*, based on the Microsoft Computer Dictionary. (Ex. 1017, 31.) That is, the TerraZones

storyboard shows *a program* (i.e., the Microsoft Internet Explorer web browser) *designed to assist in the performance of a game* (e.g., the “Cronos” game). The TerraZones storyboard specifically identifies, below the web browser’s selectable options, “visitor selects game/genre.” (Ex. 1003, 123-25; Ex. 1020, BT00014843-47.)

27. That the web browser is locally executed is evident at least because the web browser is shown executing via Microsoft Windows on the user’s PC (e.g., a Compaq PC). (Ex. 1003, 123-24; Ex. 1020, BT00014843-46.)

28. Additionally, the web browser is accessible at the user’s PC at least because, as shown in the TerraZones storyboard, the user is able to access the Microsoft Internet Explorer web browser via the PC to play the Cronos game. (Ex. 1003, 123-25; Ex. 1020, BT00014843-47.)

29. In the prosecution history, the applicant represented that in the TerraZones storyboard, “a primary electronic device accesses a game application, to thereby locally execute the game application.” (Ex. 1003, 107-08.) Based on the TerraZones storyboard, the POSITA would understand that the applicant was referring to the Microsoft Internet Explorer web browser, locally executing on a user’s computer and accessible at that user’s computer, as shown in the TerraZones storyboard in at least pages 123-24. Ex. 1003, 123-24; Ex. 1020, BT00014843-846.) The POSITA would understand the applicant to have meant that the user’s

computer (the primary electronic device) accesses the web browser (the game application) to locally execute the web browser, for at least the reasons described above.

30. Similarly, the applicant the POSITA would have understood the applicant's description that "a primary electronic device *accesses* a game application" to refer to the user's PC running the web browser. (Ex. 1003, 107-08.)

31. I am informed that the Patent Owner suggests an interpretation of "locally executed" that would exclude an application executed "via a network connection to a remote server." (Response, 20.) Although I disagree with Patent Owner's interpretation of "locally executed," it is consistent with the web browser application shown in the TerraZones storyboard. As the POSITA would understand, this web browser is executed via the user's PC without reliance on any network connection to a remote server. For example, as shown in the TerraZones storyboard, the Microsoft Internet Explorer web browser title bar indicates that it is "working offline," demonstrating that the web browser application can execute without any network connection at all. (Ex. 1003, 123-24; Ex. 1020, BT00014843-46.)

32. In the prosecution history, the applicant also described the TerraZones storyboard as "automatically integrating" business related content "into the locally

executing game application during execution of the game application.” (Ex. 1003, 107-08.) For at least the reasons described above, the POSITA would understand the applicant to have been referring to the Microsoft Internet Explorer web browser as the locally executing game application, and describing the TerraZones storyboard as automatically integrating business related content (*e.g.*, the “sponsorship option” shown in Ex. 1003 at 127 and Ex. 1020 at BT00014849) into the web browser during execution of the web browser. (Ex. 1003, 127; Ex. 1020, BT00014849.)

C. Medvidovic Textbook

33. I reviewed a portion of Dr. Medvidovic’s textbook, *Software Architecture: Foundations, Theory, and Practice*, describing a “code-on-demand” style and applying it to an example of three web browsers. (Ex. 1018, 116-19.)

34. For the reasons described below, the POSITA would understand Dr. Medvidovic’s textbook to be consistent with a web browser meeting the limitation *locally executed game application that is accessible at said primary electronic device* that appears in claim 1 of the ’028 patent. Conversely, the POSITA would understand Dr. Medvidovic’s textbook to be inconsistent with the Patent Owner’s position that a web browser cannot meet that limitation.

35. Dr. Medvidovic’s textbook describes a software architecture style called “code-on-demand,” in which an application such as a web browser

“downloads code from another site to be executed locally.” (Ex. 1018, 116-19; Ex. 1023, 93:11-94:8, 95:1-10, 125:14-20.) The textbook explains the advantages of code-on-demand: dynamic adaptability; access to computing power; and increased dependability. (Ex. 1018, 116; Ex. 1023, 102:2-9, 103:14-104:21.) Even though I understand the textbook was not published until 2009, the POSITA in 2002 would have been familiar with the code-on-demand style, and would have understood pages 116-119 of the textbook to describe that style.

36. The POSITA would understand Fig. 4-19 of the textbook to illustrate three web browsers, running on client computers, that exemplify the code-on-demand style:

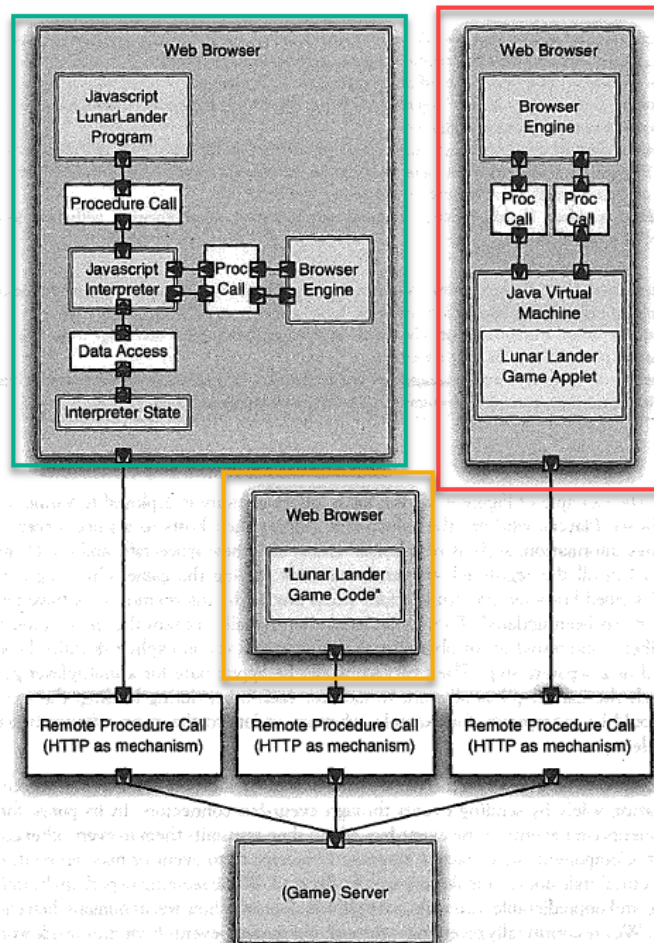


Figure 4-19.
Mobile code:
Lunar Lander as
code-on-demand.

(Ex. 1018, 118-19 (annotated).)

37. In a first example, highlighted in red above, “one client Web browser downloads code-on-demand in the form of a Lunar Lander game applet via HTTP.” (Ex. 1018, 118-19; Ex. 1023, 109:9-17.) The web browser uses its Java Virtual Machine to execute the game applet. (Ex. 1018, 118-19.) In a second example, highlighted in green, “a second browser loads a JavaScript Lunar Lander.” (Ex. 1018, 118-19; Ex. 1023, 133:12-22.) The web browser uses its JavaScript interpreter to execute the JavaScript Lunar Lander program. (Ex. 1018,

118-19.) And in a third example, highlighted in orange, a third browser uses “Lunar Lander Game Code” in an unspecified form. (Ex. 1018, 118-19; Ex. 1023, 134:17-135:11.) These web browser configurations depicted in the Medvidovic textbook existed in 2002 and would have been familiar to the POSITA in 2002.

38. The web browsers shown as configured in Fig. 4-19 are game applications: they are computer programs that assist in performing a game (i.e., Lunar Lander). Ex. 1017, 31.) Further, they are executed locally: “*all the game logic* moves to the client machines, freeing the server’s computing resources.” (Ex. 1018, 118.) (Ex. 1018, 116, 118; Ex. 1017, 31.) Similarly, the POSITA in 2002 would have understood both the web browser and the Lunar Lander game to be accessible at the client machines that locally execute the web browser. A POSITA in 2002 consulting the Medvidovic textbook would thus have understood a web browser to teach a game application.

39. Dr. Medvidovic’s textbook also includes a description of demonstration software. (Ex. 1018, 595.) The POSITA would understand Dr. Medvidovic’s description of demonstration software to be inconsistent with the Patent Owner’s position that demonstration software is “not a working copy of the software” and cannot meet the limitation “initiating” in claim 1 of the ’028 patent.

40. In his textbook, Dr. Medvidovic describes examples of time-limited, but otherwise fully-functional, demonstration software. For example, the

Medvidovic textbook describes a hypothetical game called “Lunar Lander Demo,” which is a demo version of a commercially sold “Lunar Lander Pro” product. (Ex. 1018, 595.) The textbook explains that the Pro version of Lunar Lander is “identical to Lunar Lander Demo but missing the Demo Reminder and System Clock components.” *Id.* Similarly, table 15-1 shows that the demo version of the software includes *all* components and connectors of the pro version (*e.g.*, game logic), along with *additional* components to enforce the demo’s time limits:

Table 15-1
Elements present
in each Lunar
Lander
product-line
member.

Components and Connectors	Product		
	Lite	Demo	Pro
Data Store	X	X	X
Data Store Connector	X	X	X
Game Logic	X	X	X
Game Logic Connector	X	X	X
Text-Based UI	X	X	
UI Plug-Ins Connector	X	X	X
Graphical UI		X	X
System Clock		X	
System Clock Connector		X	
Demo Reminder		X	

(Ex. 1018 at 596 (annotated).)

41. Dr. Medvidovic’s description that demonstration software (aka feature-limited software) could be upgraded to a fully-featured version is consistent with the POSITA’s understanding of demonstration software. By 2002, demonstration software was commonly used a promotional device for game applications. As the POSITA would recognize, a primary purpose of

demonstration software was to entice potential customers to purchase a paid version of the software. Accordingly, the demonstration software would frequently include many or all features of the paid version, to demonstrate the value of those features to the potential customer. As described in the textbook, such demonstration software would frequently include a time-limiting feature, preventing the user from making use of those features outside of a limited time window, thus encouraging the user to purchase the paid version. Even if the demonstration software is only a partial version of a game, the POSITA would understand demonstration software to teach a working version of a game application, including the ability to “initiate” the game application.

42. Moreover, the POSITA would understand all executable applications, including demonstration versions of applications, to teach “initiating.” This is because an application must at some point be initiated in order to begin execution.

D. “Business-Related Content” and “Dynamically Updating”

43. I understand the Patent Owner takes the position that in the ’028 patent, claim 4 is limited to branded business-related content that is “inherently part of the game,” but not “integrated into the game.” (Response, 39-41.) The POSITA would not understand this to be a limitation of claim 4. This is at least because the specification “*focuses on* the integration of business-related content

into the game application,” indicating that such content can be “branded.” (Ex. 1001, 3:27-29, 1:37-42.)

E. “Player profile”

44. I understand the Patent Owner takes the position that the “player profile” of claim 5 must be “tied” to a game character, not to the person playing the game. (Response, 46-47.) The Patent Owner relies on a description of a “character profile” in the ’028 patent: “The character profiles may include non-identifying demographic data and may be exchanged with the business sponsors so that they can tailor content or product offerings in a manner appealing to the game participants. The profiles are tied to a character representing the player, not the actual individual playing the game.” (Ex. 1001, 5:59-64.)

45. The POSITA would not understand this to be a limitation of claim 5. The POSITA would understand the claimed player profile to refer to the player who plays the game, who *may* be represented by an in-game character. For example, the ’028 patent mentions that a character profile can include “non-identifying demographic data,” which relates to the human player, not the in-game character. (Ex. 1001, 5:59-64.)

46. This understanding is consistent with the ’028 patent’s description that “players log-in at the outset of game play using a player ID and password.”

(Ex. 1001, 5:56-57.) Logging in with a player ID and password is an operation performed by a human, not a game character.

47. This understanding is also consistent with definitions provided in Merriam-Webster's Collegiate Dictionary, which defines a "player" as "a person who plays a game"; and a "character" as a "characterization esp. in drama or fiction." (Ex. 1024, 191, 890.) In my view, these dictionary definitions are consistent with the ordinary and customary meaning, to the POSITA at the time of the invention, of the term "player profile" in the '028 patent. The dictionary definitions are inconsistent with Patent Owner's position.

F. "Disseminated"

48. I understand the Patent Owner takes the position that "disseminated" in claim 6 requires the player profile to leave a first device. (Response, 50.) The POSITA would not understand claim 6 to have any such limitation. The POSITA's understanding is consistent with the dictionary definition of "disseminate": "to disperse throughout." (Ex. 1024, 335.) In my view, this dictionary definition is consistent with the ordinary and customary meaning, to the POSITA at the time of the invention, of the term "disseminated" in the '028 patent. To disperse throughout does not require leaving a device; to the contrary, as the POSITA would understand, dispersing "throughout" a device includes dispersing within the device, without necessarily leaving it.

G. Avatars

49. Avatars have been in widespread use in video games since at least the 1980s, if not earlier. By 2002, avatars were a common element of video games. Games such as Quake and Diablo are examples of games that were popular and in widespread use by 2002, and that made use of avatars to represent players in the game. By 2002, the state of the art was thus advanced.

50. In my view, the POSITA in 2002 would have known how to implement avatars into game applications without undue experimentation. Under the applicable level of skill, the POSITA has “two years of professional experience ... in the specific context of console and gaming.” (Ex. 1004, 43.) This professional experience would have included features, such as avatars, that were well-known and prevalent in the gaming field by 2002.

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code.

Executed the 7th of June, 2024 in Cool, California.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'David Crane', written over a horizontal line.

David Crane