

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the *Inter Partes* Review of:
U.S. Patent No. 8,638,301

Trial Number: To Be Assigned

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Inventor(s): David Birnbaum, Chris
Ullrich, Peter Rubin, Phong David Ngo,
and Leo Kopelow

Assignee: Immersion Corporation

Title: Systems and methods for
transmitting haptic messages

Panel: To Be Assigned

Mail Stop *Inter Partes* Review
Commissions for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF MAJID SARRAFZADEH UNDER 37 C.F.R. § 1.68 IN
SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 8,638,301

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I, Majid Sarrafzadeh, do hereby declare as follows:

I. Introduction

1. I have been retained as an expert witness on behalf of Fitbit Inc. (“Fitbit”) for the above-captioned Petition for *Inter Partes* Review (“IPR”) of U.S. Patent No. 8,638,301 (“the ’301 Patent”). I am being compensated for my time in connection with this IPR at my standard consulting rate of \$ 650 per hour. My compensation is not affected by the outcome of this matter.
2. I have been asked to provide my opinions regarding whether claims 1-6, 9-11, 14-17, 21-24, 27-29 and 31 (“Challenged Claims”) of the ’301 Patent are invalid as anticipated or would have been obvious to a person having ordinary skill in the art at the time of the alleged invention.
3. The ’301 Patent issued on January 28, 2014, from U.S. Patent Appl. No. 12/502,702 (“the ’702 Application”), filed on July 14, 2009. (Ex. 1003 at cover.) For the purposes of my Declaration, I have been asked to assume that the priority date of the alleged invention recited in the ’301 Patent is July 15, 2008.
4. The face of the ’301 Patent names David Birnbaum, Chris Ullrich, Peter Rubin, Phong David Ngo, and Leo Kopelow as the purported inventors and identifies Immersion Corporation as the purported assignee of the ’301

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Patent. (Ex. 1003 at cover.) I have reviewed the Patent Office
“Assignments on the Web” record for the ’301 Patent. This record indicates
that the named inventors assigned their interests to Immersion Corporation.
(Ex. 1016)

5. In preparing this Declaration, I have reviewed the ’301 Patent, the file
history of the ’301 Patent, several prior-art references, technical references
from the time of the alleged invention, and statements made regarding the
alleged meaning and scope of terms and phrases recited in the Challenged
Claims.
6. I understand that claims in an IPR are given their broadest reasonable
interpretation in view of the patent specification and the understandings of
one having ordinary skill in the relevant art.
7. In forming the opinions expressed in this Declaration, I relied upon my
education and experience in the relevant field of the art, and I have
considered the viewpoint of a person having ordinary skill in the relevant art
as of the priority date of the ’301 Patent. My opinions are based, at least in
part, on the following:

Reference	Date of Public Availability
U.S. Patent Application Publication No. 2007/0049313 to Grams, <i>et al.</i>	Grams was filed on August 31, 2005 and published on March 1, 2007, and is attached as Ex. 1004 to the

("Grams")	Petition for IPR.
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II. Background and Qualifications

8. I am an expert in the field of Electrical and Computer Engineering, and specialize in Wearable Systems, Embedded Systems, Design and Analysis of Algorithms, and Health Analytics. I have been an expert in the field since at least 1987. A copy of my *curriculum vitae* is attached as Exhibit 1015 and provides a comprehensive description of my relevant experience, including academic and employment history, publications, conference participation, and issued and pending U.S. patents.
9. I am currently a distinguished professor of computer science at the University of California at Los Angeles ("UCLA"), director of the UCLA Embedded and Reconfigurable Computing Laboratory ("ER Lab"), and a co-director of the UCLA Center for SMART Health. I have been actively engaged in research of Wearable Systems for 17 years and Embedded Systems, Design and Analysis of Algorithms, and Health Analytics for about 30 years.
10. I earned Bachelor of Science, Master of Science, and Ph.D. degrees from the University of Illinois at Urbana-Champaign in Electrical and Computer Engineering in 1982, 1984, and 1987, respectively.

11. I became an Assistant Professor of Electrical and Computer Engineering at Northwestern University in 1987, earned tenure in 1993, and became a Full Professor in 1997.
12. In 2000, I joined the Computer Science Department at UCLA as a Full Professor. In 2008, I co-founded and became a director of the UCLA Wireless Health Institute. I currently teach two core undergraduate courses (involving implementing digital logic designs and advanced digital design techniques), a course on Algorithms and Complexity, and a series of graduate courses in the area of embedded systems and Wireless Health.
13. I have experience as a system designer, circuit designer, and software designer. My experience includes holding positions as design engineer at IBM and Motorola and a test engineer at Central Data Corporation. I was also the main architect of an Electronic Design Automation (“EDA”) software tool for Monterey Design Systems, Inc. (“Monterey”). I co-founded and managed the technical team at Hierarchical Design, Inc. (“Hier Design”), an EDA company that specialized in reconfigurable Field-Programmable Gate Array (FPGA) systems. Hier Design was acquired by Xilinx in 2004. I am cofounder of MediSens Wireless, Bruin Biometrics, and WANDA Health.

14. I am a Fellow of the Institute of Electrical and Electronics Engineers, Inc. (“IEEE”) for my contributions to “Theory and Practice of VLSI Design.” I have served on the technical program committees of numerous conferences in the area of system design. I cofounded the International Conference on Wireless Health and have served in various committees of this conference.
15. The cases in which I have testified as an expert at trial or by deposition within the preceding five years are as follows:
 - *Cadence vs Avant Corp.*, Case No. C95-20828 (N.D. Cal.)
 - *IKOS Systems, Inc. et al. v. Axis Systems, Inc.*, Case No. C 01-21079 (N.D. Cal.)
 - *Synopsys, Inc. v. Magma Design Automation, Inc.*, Case No. C 04-03923 (N.D. Cal.)
 - *Intellectual Ventures I LLC et al. v. Xilinx, Inc. et al.*, No. 1:10-cv-01065-LPS (D. Del.)
 - *Mentor Graphics Corporation v. EVE-USA, Inc. et al.*, No. 3:10-cv-00954-MO (D. Or.)
 - *Synopsys, Inc. v. Mentor Graphics Corp.*, No. 3:12-cv-06467-MMC (N.D. Cal.), deposition testimony.
 - *Altera Corp. v. PACT XPP Techs., AG*, No. 3:14-cv-02868-JD (N.D. Cal.)

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- *Masa vs Apple*, IPR
- *Jawbone vs Fitbit*, ITC
- *Immersion vs Apple*, ITC and IPR
- *Valencell vs Apple*, IPR

16. I have been asked to render opinions regarding certain matters pertaining to the '301 patent, and asserted prior art thereto, as addressed in this declaration. As set forth herein, I am a person skilled in the art to which the '301 patent pertains, and thus, am well qualified to provide an opinion on whether the Challenged Claims of the '301 patent are invalid as anticipated or would have been obvious to a person having ordinary skill in the art at the time of the alleged invention. Exhibit 1015 has a list of my expert engagements.

III. Materials and Other Information Considered

17. I have considered information from various sources in forming my opinions. Besides drawing from over three decades of research and development in the fields of Electrical and Computer Engineering, I have reviewed the Petition in detail and agree with both its analysis and conclusions.

IV. Understanding of Patent Law

18. I understand that a patent or other publication must first qualify as prior art before it can be used to invalidate a patent claim.
19. I understand that a U.S. or foreign patent qualifies as prior art to an asserted patent if the date of issuance of the patent is prior to the invention of the asserted patent. I further understand that a printed publication, such as an article published in a magazine or trade publication, qualifies as prior art to an asserted patent if the date of publication is prior to the invention of the asserted patent.
20. I understand that a U.S. or foreign patent qualifies as prior art to an asserted patent if the date of issuance of the patent is more than one year before the filing date of the asserted patent. I further understand that a printed publication, such as an article published in a magazine or trade publication, constitutes prior art to an asserted patent if the publication occurs more than one year before the filing date of the asserted patent.
21. I understand that a U.S. patent qualifies as prior art to the asserted patent if the application for that patent was filed in the United States before the invention of the asserted patent.

22. I understand that a system or device qualifies as prior art to the asserted patent if it was in “public use,” meaning it was either accessible to the public or was commercially exploited, before the invention of the asserted patent.
23. I understand that to qualify as prior art, a reference must contain an enabling disclosure that allows one of ordinary skill to practice the claims without undue experimentation.
24. I understand that documents and materials that qualify as prior art can be used to invalidate a patent claim as anticipated or as obvious.
25. I understand that invalidity must be shown by clear and convincing evidence.
26. I understand that a claim is invalid if it is anticipated or obvious. Anticipation of a claim requires that every element of a claim be disclosed expressly or inherently in a single prior-art reference, arranged in the prior-art reference as arranged in the claim. Obviousness of a claim requires that the claim be obvious from the perspective of a person having ordinary skill in the relevant art at the time of the alleged invention. I understand that a claim may be obvious in view of a combination of two or more prior-art references.

27. I understand that obviousness analysis requires an understanding of the scope and content of the prior art, any differences between the alleged invention and the prior art, and the level of ordinary skill in evaluating the pertinent art.
28. I understand that certain factors—often called “secondary considerations”—may support or rebut the obviousness of a claim. I understand that such secondary considerations include, among other things, commercial success of the alleged invention, skepticism of those having ordinary skill in the art at the time of the alleged invention, unexpected results of the alleged invention, any long-felt but unsolved need in the art that was satisfied by the alleged invention, the failure of others to make the alleged invention, praise of the alleged invention by those having ordinary skill in the art, and copying of the alleged invention by others in the field. I further understand that there must be a nexus—a connection—between any such secondary considerations and the alleged invention. I also understand that contemporaneous and independent invention by others is a secondary consideration tending to show obviousness.
29. I further understand that a claim is obvious if it unites old elements with no change to their respective functions, or alters prior art by mere substitution

of one element for another known in the field, and that combination yields predictable results. While it may be helpful to identify a reason for this combination, common sense should guide, and there is no rigid requirement for a teaching, suggestion, or motivation to combine. When a product is available, design incentives and other market forces can prompt variations of it, either in the same field or different one.

30. I understand that the combination of familiar elements according to known methods may be proven obvious when it does no more than yield predictable results. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, obviousness likely bars its patentability. Similarly, if a technique has been used to improve one device, and a person having ordinary skill in the art would recognize that the technique would improve similar devices in the same way, use of the technique is obvious. I further understand that a claim may be obvious if common sense directs one to combine multiple prior art references or add missing features to reproduce the alleged invention recited in the claims.

31. It is further my understanding that a proper obviousness analysis focuses on what was known or obvious to a person of ordinary skill in the art, not just the patentee. Accordingly, I understand that any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.
32. I understand that a claim can be obvious in light of a single reference, without the need to combine references, if the elements of the claim that are not found explicitly or inherently in the reference can be supplied by the common sense of one of skill in the art.
33. I understand that a person of ordinary skill could have combined two pieces of prior art or substituted one prior art element for another if the substitution can be made with predictable results, even if the swapped-in element is different from the swapped-out element. In other words, the prior art need not be like two puzzle pieces that must fit together perfectly. The relevant question is whether prior art techniques are interoperable with respect to one another, such that that a person of skill would view them as a design choice, or whether a person of skill could apply prior art techniques into a new combined system.

34. In sum, my understanding is that prior art teachings are properly combined where a person of ordinary skill in the art having the understanding and knowledge reflected in the prior art and motivated by the general problem facing the inventor, would have been led to make the combination of elements recited in the claims. Under this analysis, the prior art references themselves, or any need or problem known in the field of endeavor at the time of the invention, can provide a reason for combining the elements of multiple prior art references in the claimed manner.
35. I understand that the obviousness analysis requires a comparison of the properly construed claim language to the prior art on a limitation-by-limitation basis.
36. I have written this report with the understanding that obviousness must be shown by clear and convincing evidence.

V. Background

A. Background of the Field Relevant to the '301 Patent

37. “Haptics” generally refers to the use of the sense of touch, especially in devices with a user interface. The '301 patent's disclosures and embodiments generally relate to what the specification describes as “haptic messaging systems,” that utilize visual and haptic feedback effects in

connection with the transmission of messages between users. However, messaging with associated haptic feedback between mobile devices was well known as of the filing of the '301 patent.

B. Summary of the '301 Patent

38. The '301 patent is directed a messaging system where mobile communication devices communicate using messages that can additionally contain a variety of haptic effects. (Ex. 1003 at 1:43-53.) The '301 patent includes embodiments where the users' interactions may cause visual and haptic effects. For instance, Figure 14 below concerns an embodiment where users can “clink” together virtual champagne glasses:

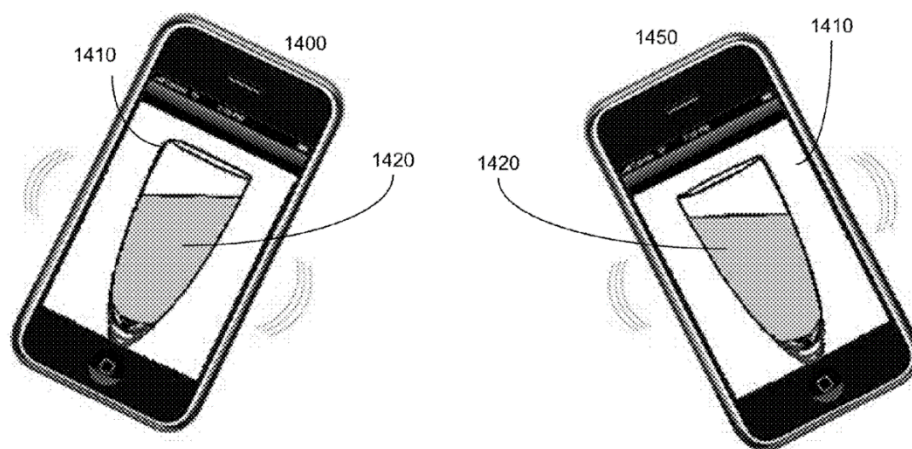


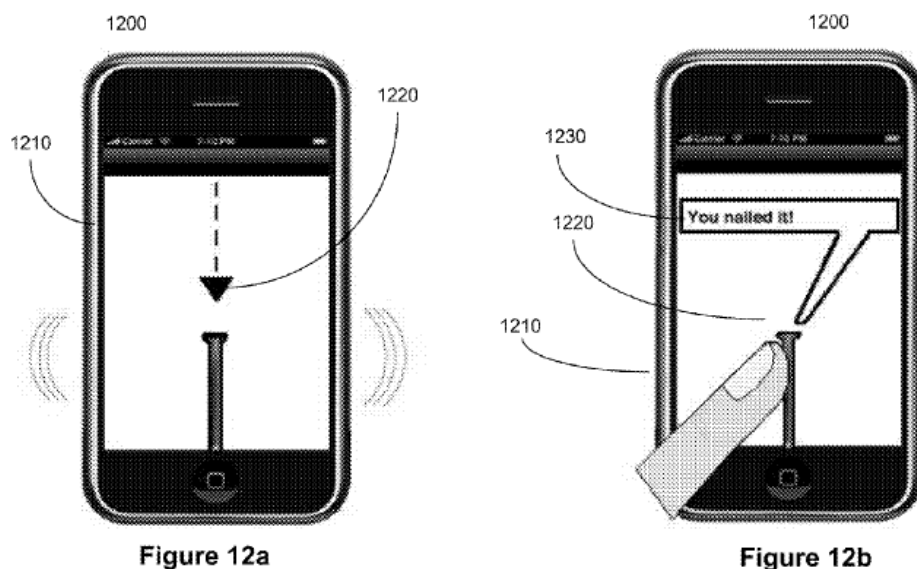
Figure 14

39. The mobile devices of the '301 patent can contain sensors capable of detecting users' interaction using conventional user interface elements, for

example, touch screens or buttons. Additionally, the devices in question feature sensors that detect device movement. The '301 patent describes several types of these sensors that sense interaction and movement, for example gyroscopes, accelerometers, GPS units, position sensors, location sensors, rotational velocity sensors, image sensors, pressure sensors, touch-screens, track balls, buttons, keys, scroll wheels, and joysticks. (*See* Ex. 1003 at 3:53-57; 6:57-7:6.) These exemplary sensors each produce signals that are routed to a device's processor. In the specific case of the champagne glass embodiment, the devices utilize a sensor for detecting device tilt (*Id.* at 21:27-41; 22:19-28). This sensor signal is present in each independent '301 patent claim. Indeed, claim 1 contains a "sensor signal" limitation where the sensor is configured to sense the movement of the mobile device. Similarly, claims 15 and 27 each require a "first sensor signal" that concerns the movement of a mobile device. (Ex. 1003 at 20:61-21:41.)

40. Additionally, the specification and the Challenged Claims reference display changes in connection with the communication between the users. Figures 12a and 12b, shown below are exemplary. Here, when the user receives a "nail" virtual message objection from another user, first the nail is displayed. Then, when the user interacts with the virtual message by pressing down on

the nail, the display changes and a haptic effect occurs (or the haptic could occur upon receiving the “nail”):



(Ex. 1003 at 18:27-49, figure 12a-12b). In the claims, for example claim 27, the nail data signal can be a “first data signal.” Further, claim 27’s language makes clear that the processor determines both a haptic effect and a change in display based on the reception of this “first data signal.” The display change is also based on the user’s interaction, as shown in Figure 12b. Additionally, claim 1 requires a “message to be displayed” but this claim contains no limitation as to whether this display must happen on the sending or receiving device. Claim 15 also contains a display change but this claim requires the display change on the transmitting device whereas claim 27 requires a display change on the receiving device.

C. The Challenged Claims of the '301 Patent

41. I understand that claims 1-6, 9-11, 14-17, 21-24, 27-29 and 31 are challenged, and they are referred to herein as the “Challenged Claims.”

D. Summary of the Prosecution History

42. The application that would result in the '301 patent (Application No. 12/502,702) was filed on July 14, 2009 with 31 claims. (Ex. 1002 at 56.) Examination began with a non-final rejection on June 15, 2012 of claims 1-31 as anticipated over U.S. Patent No. 6,573,883 (“Bartlett”). (*Id.* at 811.) The patent examiner took the position that the Bartlett reference disclosed each element of independent claim 27. The patent applicant made slight amendments to the rejected claim and responded on September 17, 2012. The primary additions to the claims concerned the addition of haptic effects. As an example, a limitation requiring a haptic effect based on a first sensor signal was added to claim 1. Additionally, the applicant added a limitation to claim 15 requiring a haptic effect based on a first data signal. The applicant took the position that Bartlett did not disclose or suggest a haptic effect, but rather it discloses a visual effect. (Ex. 1002 at 847.)
43. The examiner responded to the applicant’s arguments by issuing a final rejection of all claims on November 13, 2012. The rejection over Bartlett

was maintained. Additionally, the examiner rejected several additional claims over Bartlett in view of U.S. Patent No. 8,306,576 (“Cho”). (Ex. 1002 at 885.) The applicant replied to this final rejection on January 8, 2013 by continuing to argue that Bartlett did not teach or suggest the determination of a haptic effect. The patent office issued an advisory action on January 15, 2013 notified that the applicant’s post rejection reply did not traverse the grounds for rejection and place the application in condition for allowance. (Ex. 1002 at 992.) On February 8, 2013, the applicant requested an interview concerning the application. Further, on February 13, 2013, the applicant filed a Pre-Appeal Brief conference request for the application. Prosecution of the application was reopened following the filing of a March 4, 2013 Pre-Appeal Brief conference. The final rejection was withdrawn.

44. However, another non-final rejection of claims 1-31 was issued on May 6, 2013. In this instance, the examiner took the position that Bartlett anticipated some claims and rendered others obvious. Some claims were found obvious in view of the combination of Bartlett and Cho. Additionally, the examiner argued that all claims were anticipated by Cho. The applicant responded on August 5, 2013 by maintaining its argument concerning Bartlett’s deficiencies regarding haptic feedback. Additionally, the applicant

argued that the examiner cannot properly rely on Cho because it was filed after the provisional applications that precede the '301 patent and thus cannot serve as § 102(e) art based on its earlier priority drawn from a Korean application.

45. A notice of allowance was issued on September 17, 2013 without comment.

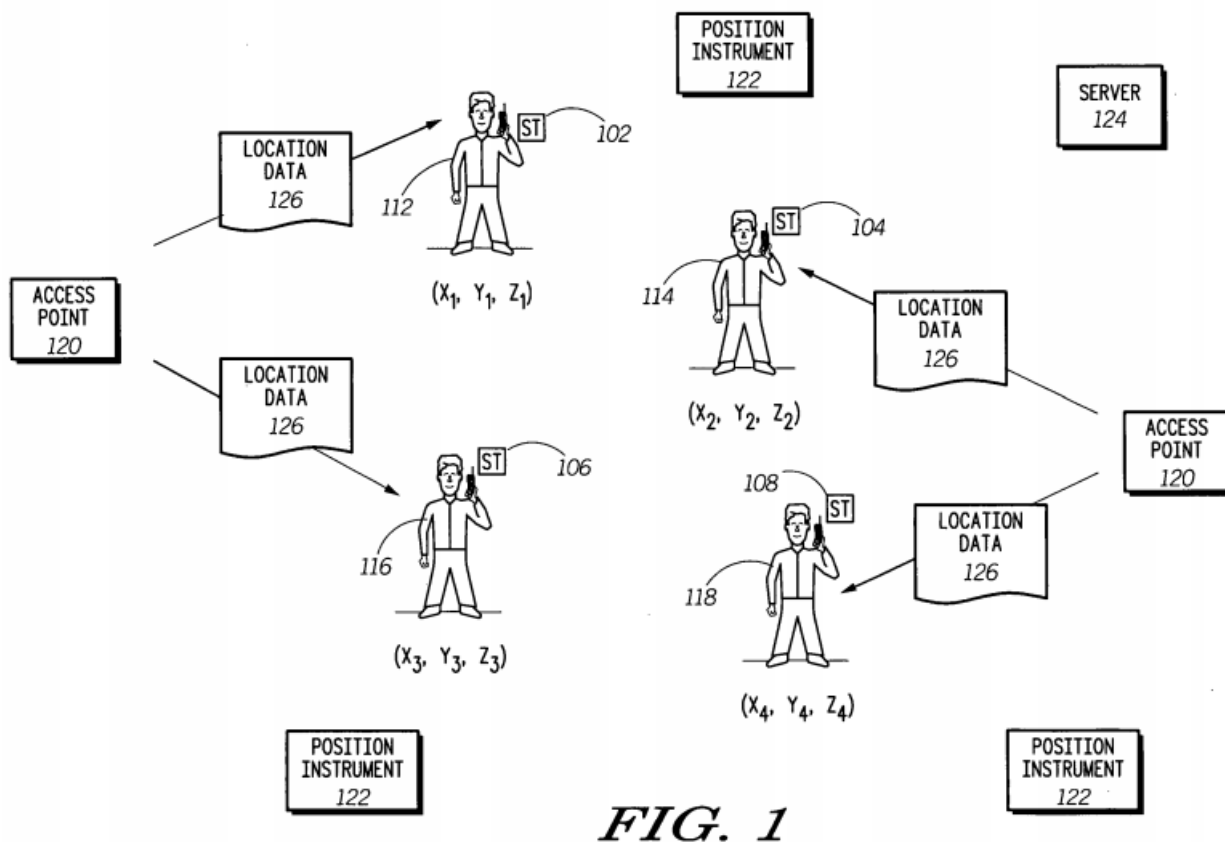
E. Level of Ordinary Skill in the Art

46. In determining the characteristics of a hypothetical person of ordinary skill in the art (“POSITA”) of the patent-in-suit at the time of the claimed inventions, I considered several things, including the breadth of devices that provide haptic feedback, the type of problems encountered in this field, and the rapidity with which innovations were made. I also considered the sophistication of the technology involved, and the educational background and experience of those actively working in the field, and the level of education that would be necessary to understand the '301 patent. Finally, I placed myself back in the relevant period of time, and considered the state of the art and the level of skill of the engineers working in this field at that time. I came to the conclusion that the characteristics of a person of ordinary skill in the field of art of the '301 patent would be a person with a Bachelor’s degree in Electrical Engineering, Computer Science, Computer

Engineering, or an equivalent field, and two to three years of postgraduate experience in that field. By this definition, I was a person of ordinary skill in the art in 2008.

F. Background on Prior Art Reference

47. Grams is directed to a gaming system where multiple players that aim and fire virtual weapons at one another using mobile communication devices. (Ex. 1004 at Abstract, [0006].) The players are dispersed across real space and their mobile devices communicate using conventional wireless or cellular forms of communication. (Ex. 1004 at [0025] (including but not limited to: IEEE 802.11 access points, global system for communications (GSM), time division multiple access (TDMA), and code division multiple access (CDMA)).) Figure 1 shows a field of wirelessly linked game participants.



(Ex. 1004 at Fig. 1; [0029]-[0030].) Grams tracks the relative locations of the players to support gameplay. (Ex. 1004 at [0011], [0032].) Grams' mobile devices have sensors (for instance, GPS) that allow each device to detect and track its own location. (Ex. 1004 at [0007], [0026].) These motion or movement sensors generate signals related to their function. These signals are similar to the '301 patent's "first sensor signal," because they are also related to the movement of the device. The game devices collect and process location information to display a user interface such that

opposing players are represented as icon on a player's screen. (Ex. 1004 at [0032], [0050].) The player interface in Grams may optionally provide a visual indicator representing each player that can target the first user in the game, and vice versa. (Ex. 1004 at [0053].) Figure 4, however, depicts a player's game interface along with icons representing other players he or she can target.

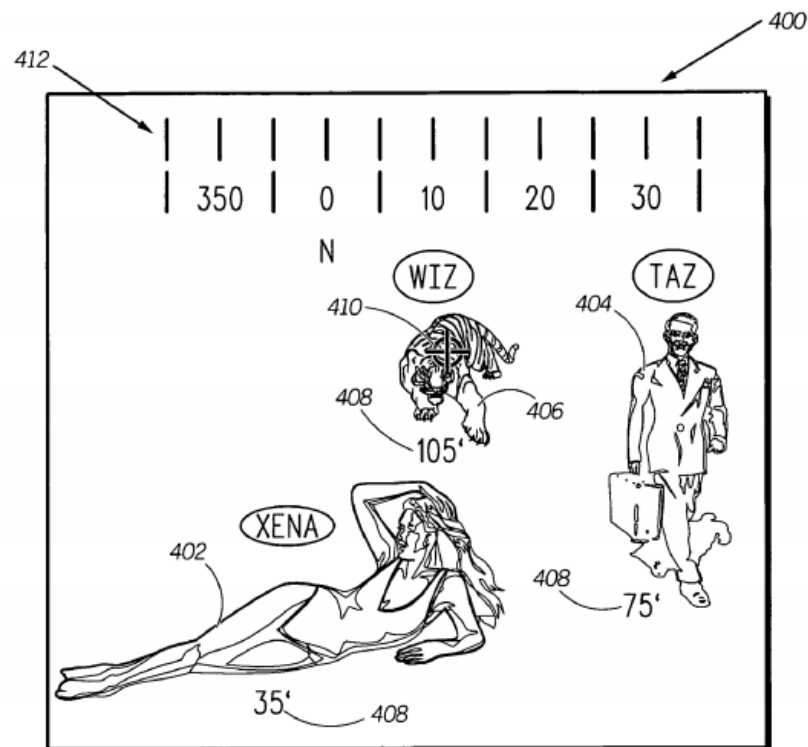


FIG. 4

(Ex. 1004 at Fig. 4.) Here, the icon over the tiger indicates that the targeting player is targeting the opposing player “Wiz.” (Ex. 1004 at [0055].) If the targeting player attempts to “fire” his or her weapon, his or her device will recognize the required user interaction and attempt to determine whether a hit was successful.

48. The mobile devices are configured to recognize player interaction with virtual weapon represented on the mobile device. (Ex. 1004 at [0036], [0011], [0032].) The various interaction devices described in Grams generate associated signals that are similar to the “second sensor signal” in some ’301 claims. For instance, claim 15, which is primarily concerned with a sending device (or a targeting device in Grams), describes a method where one device transmits a signal. The Grams mobile device uses location information and its “direction/orientation identification system” to determine whether or not the aiming player is aiming and positioned properly to cause a hit. (Ex. 1004 at [0039]-[0040].) The signal these aiming sensors generate is a further example of a “first sensor signal” as described in reference to GPS above.
49. If the aiming is successful, the targeted mobile device receives a data signal related to the “hit” or attempted “hit” from the targeting player. This

message is delivered over a network interface and corresponds to the “first data signal” described in the ’301 patent. (*Id.*). The targeted device determines a display change to inform the player they have been hit or that there has been an attempted hit. Additionally, the player of the targeted is able to interact with that device. Notably, a sensor on the targeted device that detects the user’s interaction generates a signal that corresponds to the “second sensor signal” in a number of ’301 patent claims (claim 27, for example). The targeted player’s interaction with his or her device also partially determines the display change experienced when the device receives a “first data signal.” Specifically, the targeted player in Grams interacts with his or her device and generates an associated signal when he or she enters and plays the game. The targeted player’s mobile device also determines and outputs a haptic effect based at least in part on the received first data signal. In the event of a successful weapon hit, a haptic notification may accompany the visual notification to the targeted player. (Ex. 1004 at [0012], [0043].)

VI. Detailed Invalidity Analysis

A. Claims 1-6, 9-11, 14-17, 21-24, 27-29, and 31 are Obvious in View of Grams in Combination with the Knowledge of a Person of Ordinary Skill in the Art

50. Grams discloses each element of Claims 1-6, 9-11, 14-17, 21-24, 27-29, and 31 of the '301 Patent.

1. Independent Claim 1 Is Obvious

(1) Preamble: Grams discloses a method

51. Claim 1 of the '301 describes a method that displays a message on the user interface of a mobile device and provides haptic feedback based on input from a motion sensor.

(2) Element 1[a]: Grams discloses “receiving at least one sensor signal from at least one sensor of a mobile device, the at least one sensor signal associated with a movement of the mobile device.”

52. Element 1[a] of the '301 Patent requires “receiving at least one sensor signal from at least one sensor of a mobile device, the at least one sensor signal associated with a movement of the mobile device.” Grams teaches a mobile device equipped with multiple sensors that transmit signals regarding the movement of the mobile device. Grams discloses a location based game where participants are able to target and fire upon one another with virtual weaponry. Grams' system includes a “location identification system 210

can be, for example, a GPS.” (Ex. 1004 at [0038].) One of skill in the art would have known of global position systems (GPS) and other positioning systems. Indeed, such systems were well known in the art as of Grams’ filing. Additionally, a person of skill in the art would have appreciated that the inclusion of such system in mobile devices would amount to no more than the inclusion of conventional features in such devices. Indeed, the inclusion of such location tracking features was commonplace at the time of Grams’ filing. The mobile devices of Grams use these location identification systems to generate location information that is shared amongst the various players’ devices. Players are able to target other devices based on their relative location to that device.

53. The mobile devices of Grams also feature “a direction/orientation identification system.” (Ex. 1004 at [0039].) These local motion sensors are used in the process of aiming the firing player’s virtual weapon. This system can contain a number of different sensors, including “a compass 212 and an inclinometer 214.” (*Id.*) Mobile stations in the Grams system use this direction/orientation system “to determine a direction in which the station 200 is oriented.” (*Id.*) Figure 2 of Grams shows a block diagram of an exemplary mobile station. This diagram includes multiple sensors that

satisfy this claim limitation. These sensors include at least: “Location ID system 210,” “Compass 212,” and “Inclinometer 214.”

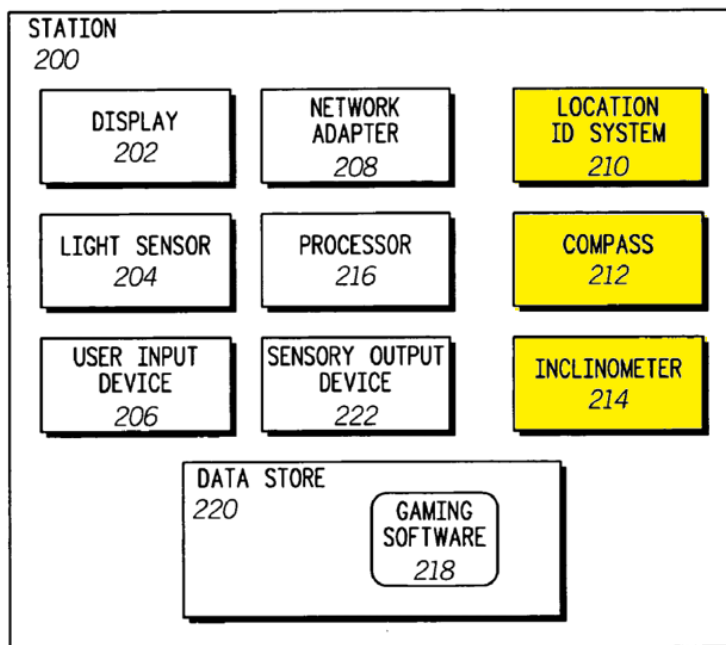


FIG. 2

(Ex. 1004 at Fig. 2 (emphasis added); [0007], [0038]-[0041].) Additionally, the movement sensors onboard this device generate signals “that can be processed” by processor 216. (Ex. 1004 at [0038]-[0041]) (“The processor 216 can be communicatively connected to any of the station components to receive, process and generate data in accordance with the requirements of gaming software 218.”)

54. Additionally, these sensors generate a signal “associated with a movement of the mobile device.” As an example, Grams mobile device includes “[a] location identification system 210.” (Ex. 1004 at [0038]; *see also* [0007].) Grams states that the location identification system can be any type of location identification system, including GPS. (*Id.*) As such, using GPS or any suitable alternative location identification system, Grams discloses receiving at least one sensor signal (GPS signal or other) from at least one sensor (location identification system 210), where that sensor signal is associated with movement of the mobile device.
55. Grams’ discussion of the “compass 212” also discloses this limitation. The specification provides that “[t]he compass 212 can be used to determine a direction in which the station 200 is oriented.” (Ex. 1004 at [0039].) This evidences that when a player rotates his or her phone when aiming and/or shooting a virtual weapon, the compass 212 senses the motion of the mobile device.
56. Grams’ specification states that the “inclinometer 214 can be used to determine an inclination of station 200.” (Ex. 1004 at [0040].) Furthermore, “[t]he inclinometer 214 can be a digital tilt sensor, such as an accelerometer ASIC, a micro electromechanical system (MEMS) device, or any other

device suitable for sensing inclination.” (*Id.*) Here, changes in the level of tilt or inclination is the measured movement.

(3) Element 1[b]: Grams discloses “determining a message to be displayed in a user interface based at least in part on the one sensor signal.”

57. The next limitation of Claim 1 of the '301, element 1[b], requires “determining a message to be displayed in a user interface based at least in part on the one sensor signal.” As noted in discussion concerning element 1[a], Grams’ devices include motion sensor signals that track location and aid aiming. Aiming results in a message being display when a targeting player aims and fires a virtual weapon. (Ex. 1004 at [0058]-[0061].). The targeting device determines whether or not a “hit” occurs based on relative location and orientation. Further, the targeting device determines whether or not to display an accompanying message in the user interface. (Ex. 1004 at [0039]-[0040]; [0056]; [0060].) Figure 5 shows a flow chart of the game’s aiming process. Beginning at step 504 (“determine a location of the second station with respect to the first station”), the targeting device determines the location of the second device based on location sensor information (GPS, for example). (Ex. 1004 at [0026]-[0028].) Steps 508 through 516 show that the system determines whether the first player hits the second player using

location and aiming information from the movement sensors. As an example, step 512 states “determine aiming direction based on current direction, inclination and location of first station.” In step 516, the system determines whether “the second station [is] located where the first station is aimed.” Steps 518 and 522 then report a hit or miss, respectively. As such, whether a “hit” or “miss” message is displayed is determined based on movement sensor information (from the location ID system 210, the compass 212, or the inclinometer 214).

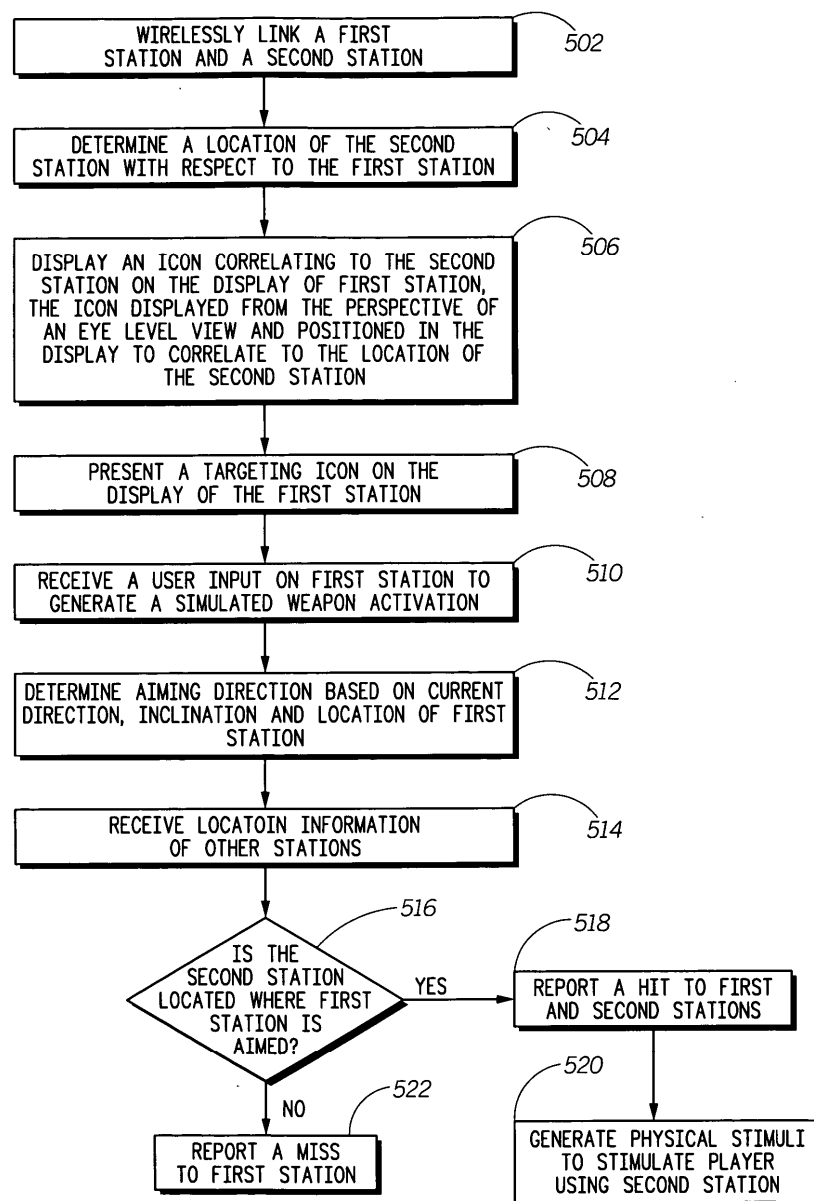


FIG. 5 500

(Ex. 1004 at Fig. 5.) Grams' mobile devices provide "hit" and a "miss" notifications messages determined by the system and displayed in the user interface (the screen of the device). Each such message satisfies this claim

limitation because they result from the evaluation of the sensor signals from sensors directed to detecting motion and they are thus “based at least in part on the one sensor signal.” Grams provides that upon successful targeting, *i.e.*, “if the second station is located where the first station is aimed . . . **Both the first and second stations can display a message on their respective displays** to indicate to players that the player using the second station has been hit.” (Ex. 1004 at [0061] (emphasis added).)

58. A “near miss” or a complete “miss” causes another type of message to be displayed: “[i]f the location of one or more of the stations 104, 106, 108 is near the direction the station 102 is aiming, but not directly on target, the station 102 can declare a **near miss**, and again communicate this information to the other stations.” (*Id.* at [0034].) “In the case of a near miss, a damage level can be communicated with the near miss communication.” (*Id.*) The damage a near miss causes to the affected player is “determined by the degree of alignment, or proximity, of a station 104 to the direction and elevation where the station 102 is aiming, and the type of weapon being simulated.” (*Id.*) A complete miss may result in a related message being transmitted to both players as well. (Ex. 1004 at [0062].)

59. To the extent the specification of Grams does not make clear that the “near miss” and “miss” messages can be transmitted to or displayed on both the targeting and targeted players’ devices, this would have been obvious to one of skill in the art. Indeed, providing mutual notification of major game events (like taking damage in the case of a near miss or someone attempting to cause damage in the case of a complete miss) would have been obvious to one of skill in the art so as to provide all vital information to players. For instance, providing a notification to the targeted user would give them a chance to respond by moving or returning fire. Additionally, a person of skill in the art would appreciate the benefits of providing mutual visual and haptic notifications to both players. For instance, providing mutual notifications for each player gives players more information about the state of game activity would help to stimulate more active gameplay. Additionally, one of skill in the art would appreciate that the combination of haptic and visual notifications would serve to improve immersion in the game as desired by Grams.
60. At least because differing circumstances result in different messages, the system determines the type of message to be displayed.

(4) Element 1[c]: Grams discloses “determining a haptic effect based in part on the first sensor signal.”

61. The next limitation of Claim 1 of the '301, element 1[c], requires “determining a haptic effect based in part on the first sensor signal.” Figure 5’s flow chart describes a targeting sequence that results in a visual effect and the determination and outputting of a haptic effect. Indeed, if a second user is hit, “a physical stimulus can be generated to stimulate the player using the second station.” (Ex. 1004 at [0061].) Notably, “the second station can vibrate, or the second player can receive an ultrasonic pulse generated by the first station.” (*Id.*) For example, the specification provides that a device may generate a physical or audible sensation to its player or the player of another device in response to, for example, simulated weapon fire. (*see* Ex. 1004 at [0043].) Indeed, the specification states that the sensor output device can “include a vibration generator that vibrates the station 200 when the player using the station 200 is successfully targeted by a simulated weapon firing by a user of a second station, for instance in response to receiving a hit message.” (*Id.*) When one player accurately aims and fires his or her virtual weapon on another player the sequence results in vibration (haptic) feedback that is based in part on the first sensor signal. The vibration is based on the first sensor signal because whether or not a hit

registers is based on first sensor information concerning the relative locations and the orientation of the targeting device. Thus this embodiment teaches this limitation because the “hit” vibration is based at least in part on the “one sensor signal associated with a movement of the mobile device.”

62. Additionally, Grams determines haptic feedback in response to a “near miss.” Indeed, the specification notes that some weapons, *e.g.*, a shotgun or a grenade launcher, *see* Ex. 1004 at [0032]-[0034], do not require a direct hit and, as such, a near miss may damage an opponent and cause haptic feedback. (*Id.*) If Immersion takes the position that this this limitation requires different or varying haptic effects, Grams’ discloses a system where the devices may vary the intensity of the haptic feedback on the targeted device based on the accuracy of the firing device teaches this capability. Grams provides that “[t]he intensity of the physical stimuli...can correlate to the degree of alignment of the targeting icon.” (Ex. 1004 at [0056].) As such, “the level of physical stimuli generated can be relatively greater when the targeting icon 410 is precisely aligned with one of the icons.” (*Id.*) This disclosure shows that determining haptic feedback resulting from a “near miss” constitutes determining a haptic effect based on movement. Additionally, the intensity of the haptic effect may be determined based on

the relative positions of the devices and the orientation of the targeting device. (Ex. at [0009], [0012], [0056], [0058]-[0062], Cls. 3-5, 14-16 and 21-22.)

63. In view of Grams' specification, it would have been obvious to one of ordinary skill in the art that the targeting device may generate a haptic effect in connection with its attempted shot. As an initial matter, it would be obvious to one of skill in the art that the targeting device may contain the same hardware as the targeted device, which would include the haptic hardware. Indeed, Figure 1 of the patent indicates the devices used by the different players may be similar or identical, and there is no indication that the device are required to have different hardware or capabilities. As previously stated given the hardware capabilities of the Grams devices and Grams broader goals of creating a realistic game, a person of skill in the art would have been motivated to include haptic feedback along with notifications concerning successful and attempted shots. Specifically, one of skill in the art would have appreciated that by relating the intensity of haptic feedback to the accuracy of the shot would help to increase game immersion and realism. Additionally, it would have been obvious to one of ordinary skill in the art that, given Grams' specification's evidence suggesting that

the embodying devices may be any one of a number of conventional mobile communication devices, that two participating devices could be the same. (Ex. 1004 at Fig. 2, ¶¶ [0009]; [0024]; [0026]; [0032]; [0050]; [0053].) Grams' specification also indicates that each device notifies the associated player upon a hit. Further, a person of skill in the art would appreciate the benefit of providing the targeting device with haptic feedback in conjunction with the notification, just as provided on the targeted device. (Ex. 1004 at [0053]; [0061].) Indeed, it would have been obvious to one of skill in the art that generating haptic feedback on the targeting device in the event of a hit would allow for a more immersive experience and the intensity could be varied so as to inform the player of the amount of damage they have caused. (Ex. 1004 at [0043].) The physical stimuli (haptic effect) is based in part on the first sensor signal regardless of whether or not it takes place on one or both devices. In each case, whether there is any physical feedback and its intensity are each determined based on information from the movement sensors that determine the first player's aiming. Additionally, one of skill in the art would have found it obvious for the mobile devices of Grams to determine haptic effects in response to "miss" messages as well as "hits" and "near misses" given the benefits of keeping players as up to date on the

status of gameplay as possible. Indeed, notifying in the event of a miss provides the player that was attacked with information that would be important to them as they play the game. Additionally, providing this information would stimulate more active gameplay. For instance, if a player is haptically notified that someone else has attempted to fire upon them, they may move or return fire. As such, Grams discloses this limitation.

(5) Element 1[d]: Grams discloses “causing the message to be displayed and the haptic effect to be output.”

64. The final limitation of Claim 1 of the '301, element 1[d], requires “causing the message to be displayed and the haptic effect to be output.” As indicated concerning elements 1[a] through 1[c], Grams’ specification teaches determining a message to be displayed and determining a haptic effect, and the devices also cause the message to be displayed and the haptic effect to be output. Grams thus discloses this limitation. (Ex. 1004 at [0058]-[0062].)

2. Dependent Claim 2 Is Obvious

65. Claim 2 of the '301 recites:

The method of claim 1, wherein the at least one sensor comprises one or more of: an accelerometer, a gyroscope, a touch-sensitive input device, a camera, or a GPS sensor.

66. Grams also teaches this limitation. Notably, Grams discloses a first sensor that comprises a GPS sensor. As described above, Grams features a location identification system that may be embodied as a GPS sensor. (*See* Ex. 1004 at [0038]; *see also, id.* at [0039]-[0041], [0007], Fig. 2.) Additionally, Grams teaches a direction/orientation identification system that can be comprised of one or more motion sensors. Grams provides, as an example, an “accelerometer.” (Ex. 1004 at [0040].) As such, Grams discloses this limitation.

3. **Dependent Claim 3 Is Obvious**

67. Claim 3 of the ’301 recites:

The method of claim 1, wherein the at least one sensor comprises a plurality of sensors.

68. As described above in connection with Claim 1, Grams’ target identification and aiming process employs multiple sensors. Grams describes a mobile device equipped with GPS for broad location determination and a “direction/orientation identification” system that can include both a compass and an inclinometer, which are each a sensors used to determine the orientation of the device for aiming. (*See* Ex. 1004 at [0036], [0038]-[0040],

[0007], Fig. 2.) This multitude of sensors constitutes “a plurality of sensors.” As such, Grams satisfies this limitation.

4. Dependent Claim 4 Is Obvious

69. Claim 4 of the '301 recites:

The method of claim 3, wherein

a first sensor of the plurality of sensors comprises an accelerometer and a second sensor of the plurality of sensors comprises a touch-screen.

70. As discussed above concerning claim 3, Grams alone discloses a first sensor comprising an accelerometer. (*See* Ex. 1004 at [0038]-[0040], [0007], Fig. 2.) One of skill in the art would have known, prior to the priority date of the '301 patent, that Grams also disclosed or rendered obvious a second sensor that comprises a touch-screen. For example, the mobile devices in Grams may be mobile phones. (Ex. 1004 at [0005], [0024], [0063], Fig. 1.) The mobile phones described in Grams may have buttons or touch pads to allow user input, and a screen to display the game and graphical user interface. (Ex. 1004 at [0064] (“The gaming device 700 can include user input controls 702, for instance buttons and/or touch pads, for receiving user inputs, and an adjustable display 704 can be provided to present the GUI.”) One of skill in the art reading Grams would know that a touch screen could be used as an

alternative or additional user interface. For example, prior to the priority date of the '301 patent, the original iPhone was released, in 2007, and used a touch screen as a user interface, and ran games (as in Grams) using a touch screen as a user input mechanism. (Ex. 1005) More generally, touch screens have been around much longer, and one of skill in the art would have known that using a touch screen was an obvious possibility in Grams, and would have had certain benefits, such as creating a more engaging experience for the user and allowing more of the device to be devoted to a screen rather than to buttons or touch pads.

5. Dependent Claim 5 Is Obvious

71. Claim 5 of the '301 recites:

The method of claim 1, wherein the message comprises predefined characteristics.

72. Grams also teaches this limitation As provided above concerning elements 1[b] through 1[d], both the targeting and targeted device are capable of determining and outputting messages when a targeting player fires his or her weapon at a targeted player. As discussed above concerning elements 1[b] and 1[c], the message provided to the players is meant to convey whether the targeting player has successfully hit the targeted player and the how

accurately. Given this purpose, one of skill in the art would have appreciated that the message displayed to the player could be predefined by containing the word “hit” or it could be predefined by containing the words “miss” or “near miss” or any other suitable in game message. Indeed, a person of skill in the art would know that the transmission of messages with characteristics defined prior to transmission was part of conventional communication systems at the time of Grams’ filing. Grams thus discloses this limitation. (Ex. 1004 at [0058]-[0062], *see also, id.* at Fig. 5.)

6. Dependent Claim 6 Is Obvious

73. Claim 6 of the ’301 recites:

The method of claim 5, wherein the predefined characteristics comprise: a shape and a haptic effect.

74. Grams discloses this limitation. As provided concerning elements 1[b], 1[d] and claim 5, the predefined characteristics of the message comprise a shape and a haptic effect. Grams teaches an embodiment using visual identifiers that are different for hits and misses. As these identifiers are visual, a person of skill in the art would know that they constitute a shape that appears on the player’s screen when the message is displayed. Furthermore, as provided in connection with claim 1, a successful hit or near miss can include a haptic

effect. As such, the messages displayed constitute both a shape and a haptic effect. Grams thus discloses this limitation.

75. Grams discloses this limitation. Indeed, as provided in connection with elements 1[b], 1[d] and claim 5, the predefined characteristics of Grams' message comprise a shape and a haptic effect. Indeed, as provided in discussion concerning claim 5, Grams discloses the determination and display of messages that differ depending on whether a "hit," "miss" or "near miss" has occurred. Additionally, these messages may have predefined visual components (*e.g.*, text or graphical indicators) that are presented to the players. One of skill in the art would know that the visual components of such messages constitute a shape. For instance, the shape of a graphic for a "hit" message. Further, as provided concerning elements 1[c] and 1[d], the message output can be accompanied by haptic effects. Grams thus discloses this limitation.

7. Dependent Claim 9 Is Obvious

76. Claim 9 of the '301 recites:

The method of claim 1, further comprising detecting a user interaction associated with the message.

77. Grams discloses this limitation. Grams concerns a game of firing virtual weapons where notifications are displayed as a result. Indeed, it would have been obvious to one of ordinary skill in the art that the system would be designed such that players could interact with these notifications. (Ex. 1004 at [0058]-[0062].) As an example, a person of skill in the art would have appreciated at least the ability to dismiss these notifications so that the player can focus on the current state of play in the game. Indeed, one of skill in the art would have known that, at the time of Grams' filing, mobile communication devices with the ability to dismiss notifications were commonplace. In this instance, a player's device would detect an interaction associated with the message when the notification is dismissed.
78. In the event that this limitation is read to require a user interaction associated with generating a message, the disclosures of Grams still satisfy this limitation. As provided in connection with Claim 1, Grams is directed to a virtual weapon firing game. Grams' gameplay interface features a targeting icon on the display of the player's device with icons representing the other players. The player interacts with the mobile device when he or she aims and fires a virtual weapon. (See Ex. 1004 at Fig. 5 at 510.) The player determines the aiming direction of the intended weapon firing using

inclination, direction, and orientation sensors. The first player interacts with his or her mobile device as part of the process of aiming the device and firing the weapon. If the weapon is accurately aimed, the attack causes the transmission of a message to the opposing player and that message is associated with the first player's user interaction through his or her targeting action. Here, the first player's targeting and firing user interaction is associated with a message displayed on both devices. (Ex. 1004 at [0039]-[0040], [0056], [0060].) As such, Grams satisfies this limitation under either reading.

8. **Dependent Claim 10 Is Obvious**

79. Claim 10 of the '301 recites:

The method of claim 9, wherein the user interaction comprises an input on a touch-sensitive input device of the mobile device.

80. Grams teaches this limitation as well. Grams' specification states that "[t]he gaming device 700 can include user input controls 702, for instance buttons and/or **touch pads**, for receiving user inputs, and an adjustable display 704 can be provided to present the GUI." (Ex. 1004 at [0064] (emphasis added).) Grams thus teaches this limitation.

9. Dependent Claim 11 Is Obvious

81. Claim 11 of the '301 recites:

The method of claim 9, wherein the user interaction comprises tilting the mobile device.

82. Grams teaches this limitation as well. As provided in connection with claim 1, Grams discloses a tilt sensor. Notably, Grams' specification states that its inclinometer "can be used to determine an inclination of [the] station." (Ex. 1004 at [0040]; *see also, id.* at [0033], [0041], [0060].) Furthermore, the inclinometer described in Grams may be embodied as "a digital tilt sensor, such as an accelerometer ASIC, a micro electromechanical system (MEMS) device, or any other device suitable for sensing inclination." (*Id.*) As such, it would have been obvious to one of skill in the art that a player could interact with the message disclosed in claim 9 by tilting the device, as an alternative to the other interactions discussed, for example, the touch pads of claim 10. Notably, accelerometer based mobile device input was well known at the time of Grams' publication. Mobile devices utilized tilt based user interaction for a wide range of features including reorientation of the user interface (in the case of the original iPhone) and number dialing (in the case of the Samsung SCH-S310). Indeed, as provided by Figure 5 of Grams,

the aiming direction and accuracy is determined based on these sensors and thus alteration of the orientation constitutes user interaction. As such, Grams discloses this limitation.

10. Dependent Claim 14 Is Obvious

83. Claim 14 of the '301 recites:

The method of claim 9, further comprising transmitting a signal associated with the message to a recipient.

84. As provided in connection with claim 1, Grams' system involves the transmission of messages that are displayed based on "hit," "miss," or "near miss" has occurred. Grams' mobile devices transmit signals associated with these messages to the targeted player or both players, as demonstrated above in discussion concerning claim 1, so that the messages may be displayed. Indeed, Grams describes a scenario where the first device transmits a "hit" notification (which causes the associated message to be displayed) to the second device, or in the alternative a server can transmit the "hit," "miss," or "near miss" notification to both devices. (Ex. 1004 at [0034], [0061]-[0062]).

85. If claims 9 and 14 are read to require a user interaction associated with the generation of a message, Grams' specification still satisfies the limitation.

For instance, the transmitted “hit,” “miss,” or “near miss” notifications are signals that are generated from a user interaction associated with the creation of a message. (Ex. 1004 at [0039]-[0040], [0056], [0058]-[0062].)

11. Independent Claim 15 Is Obvious

(1) Preamble: Grams discloses a method

86. Claim 15 of the '301 describes a method for receiving motion sensor input, user input from a touch-sensitive user input device, displaying a message based on the user input, transmitting a data signal to a second device concerning the motion sensor signals and user input signals and determining a haptic effect based on that data signal.

(2) Element 15[a]: Grams discloses “receiving a first sensor signal from a first sensor, the first sensor signal associated with a movement of a first mobile device.”

87. Element 15[a] of the '301 Patent requires “receiving a first sensor signal from a first sensor, the first sensor signal associated with a movement of a first mobile device.” As discussed above, in connection with claim 1, as provided concerning element 1[a], Grams’ embodying mobile devices may contain multiple sensors that generate signals associated with movement of a first mobile device as well as processors configured to process those signals.

(Ex. 1004 at [0007], [0038]-[0040], Fig. 2; element 1[a]). As such, Grams discloses this limitation.

(3) Element 15[b]: Grams discloses “receiving a second sensor signal from a touch-sensitive interface of the first mobile device, the second sensor signal associated with a user interaction.”

88. Element 15[b] of the '301 Patent requires “receiving a second sensor signal from a touch-sensitive interface of the first mobile device, the second sensor signal associated with a user interaction.” Grams is directed to a location aware virtual game that allows players to aim and fire weapons at one another based on their respective locations. (Ex. 1004 at [0022].) Step 510 of Grams' Figure 5 is part of the aiming and firing sequence. This step shows the player aiming and firing a weapon by interacting with his or her mobile device, which results in the generation of an associated signal:

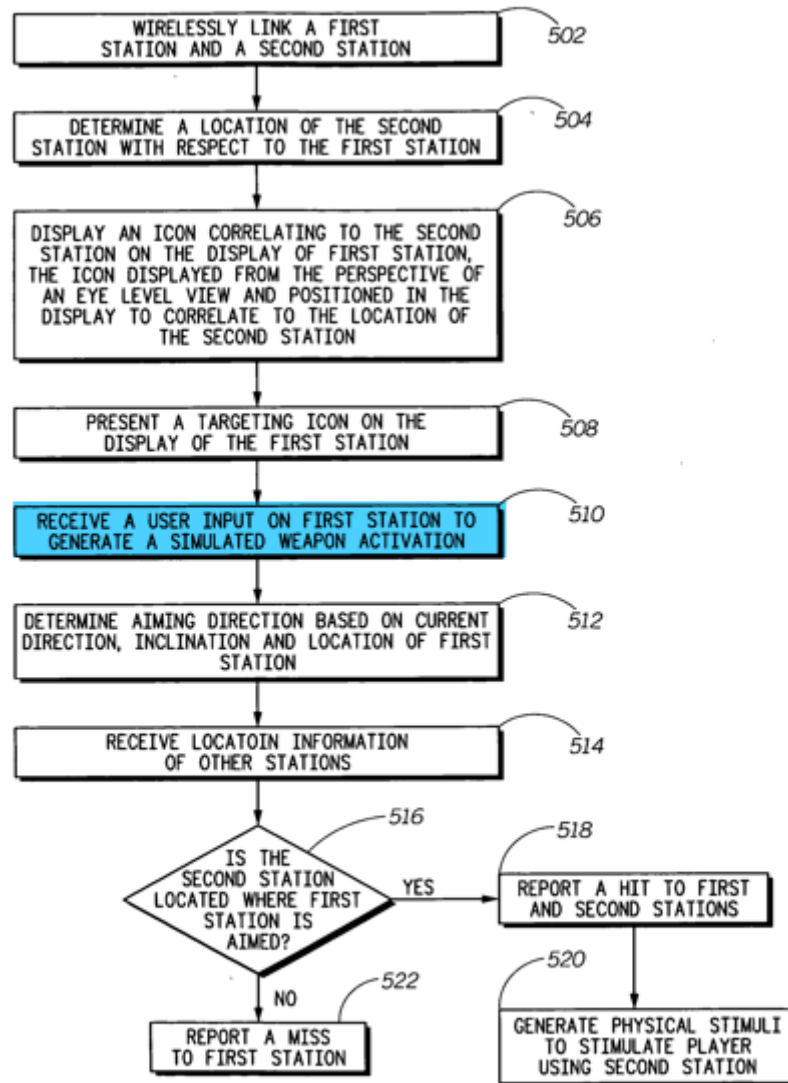


FIG. 5 500

(Ex. 1004 at Fig. 5. (emphasis added)). Notably, the specification describes a number of touch-sensitive user interfaces that may be used to detect and generate the signal associated with this user interaction: “user input device 206 can include a keypad, a touch pad, buttons, switches, sensors, and/or any

other devices which can be used to receive user inputs.” (Ex. 1004 at [0036]; *see also, id.* at [0064].).

89. The process by which a player aims and fires a weapon in the Grams system requires user interaction and in certain embodiments, the player interacts with a touch-sensitive user input device. In this instance, the aiming and firing of the weapon is an example of the system receiving a second sensor signal associated with user interaction. Thus Grams satisfies this limitation.

(4) Element 15[c]: Grams discloses “determining a change in a display of the first mobile device based at least in part on the second sensor signal.”

90. Element 15[c] of the ’301 Patent requires “determining a change in a display of the first mobile device based at least in part on the second sensor signal.” As discussed in connection with element 15[b], the first mobile device (the targeting device) determines a display change based at least in part on the second sensor signal (associated with user interaction to fire the virtual weapon). (Ex. 1004 at [0058]-[0062].) Indeed, weapon fire may cause the affected devices to determine display changes that correspond to three types of messages that satisfy this claim limitation (“hit,” “miss” or “near miss” messages). (*Id.*) These messages are based on the sensor signals described in claim 1. As such, Grams discloses this limitation.

(5) Element 15[d]: Grams discloses “transmitting a first data signal to a second mobile device, the first data signal comprising data associated with the user interaction and the movement of the first mobile device.”

91. Element 15[d] of the '301 Patent requires “transmitting a first data signal to a second mobile device, the first data signal comprising data associated with the user interaction and the movement of the first mobile device.”
92. As show in discussion concerning elements 15[a]-[c], the Grams system compares players' relative location when a targeting player (first mobile device) fires his or her weapon (user interaction) the success of aiming is determined based on the location, orientation, and tilting of the aiming device (movement). (Ex. 1004 at [0043], [0056], [0058]-[0062].) Grams' system sends a data signal with information concerning whether there was a “hit” or “near miss” to the targeted device (second mobile device). Additionally, the system transmits a similar data signal to the first mobile device, if a “server” is employed to manage the game and is thus the entity sending the message. This data signal or these data signals (depending on the embodiment in question) comprise data associated with the user interaction and movement of the first mobile device because the signal sent depends on the firing of the virtual weapon by the first player and the movement of the

first device in that these factors determine where or not a “hit” or “miss” should register.

93. Importantly, the '301 patent discloses embodiments that confirm that the type of “association” discussed above satisfies this claim. Indeed, the '301 patent explains that “a quick flick is associated with a fast transmission characteristic of a virtual message object,” such that if a user flicks the ball quickly, the transmitted signal will contain data concerning that high speed of travel, which is “associated with” how quickly the user performed the flicking gesture. (Ex. 1003 at 7:50-60; *see also id.* at 4:1-21.) The hit message transmitted by a Grams device is “associated with” the accuracy of the targeting player’s aiming and firing gestures. (Ex. 1004 at [0039]-[0040], [0056], [0058]-[0062].) As such, Grams discloses this limitation.

(6) Element 15[e]: Grams discloses “determining a haptic effect based at least in part on the first data signal and outputting the haptic effect.”

94. Element 15[e] of the '301 Patent requires “determining a haptic effect based at least in part on the first data signal and outputting the haptic effect.” As show in discussion concerning elements 1[c] and 1[d], the targeted device is capable of determining and outputting haptic effects based at least in part on the received signal (first data signal) containing a message indicating a

potential “hit” or “near miss.” (Ex. 1004 at [0009], [0012], [0043], [0056], [0058]-[0062], Cls. 3-5, 14-16, 21-22).) As such, Grams discloses this limitation.

12. Dependent Claim 16 Is Obvious

95. Claim 16 of the '301 recites:

The method of claim 15, wherein

the touch-sensitive interface comprises a touch-screen display.

96. As discussed above in connection with claim 4, using a touch-screen display as a user-input mechanism and touch-sensitive user interface in Grams was obvious.

13. Dependent Claim 17 Is Obvious

97. Claim 17 of the '301 recites:

The method of claim 15, wherein the determining a change in the display of the first mobile device and the transmitting a data signal to a second mobile device occur substantially simultaneously.

98. Grams discloses this limitation. As discussed in connection with claims 1 and 15, Grams is directed to a location based gaming system that allows players to exchange virtual weapon fire based on their locations.

99. Additionally, as provided in connection with claims 14 and 15 Grams' mobile devices are configured to determine display changes based on the reception of "hit," "miss," and "near miss" messages that can be sent directly from another device or from a server managing the gaming environment. Notably, in each case one of skill in the art would appreciate the desirability for the determination of the display change to occur substantially simultaneously with the transmission of the first signal. Grams is directed to providing players with a realistic gaming experience by presenting a game that is based on realistic and dynamic player movement. Given participants' ability to move freely in the game and thus necessitate the dynamic updating of location information, a person of skill in the art would have appreciated the usefulness of an embodiment where the display change substantially simultaneously as the transmission of a first data signal. Indeed, as noted by Grams' specification, the embodiment where location data is distributed by a server transmits the data "simultaneously with a common signal." (Ex. 1004 at [0030].) One of skill in the art would have appreciated that simultaneous transmission to devices that can be embodied with identical hardware would lead to simultaneous processing of data and thus subsequent display change would occur "substantially simultaneously."

Notably, a person of skill in the art would have known that, given the capabilities of mobile communication devices at the time, the display change would have also occurred “substantially simultaneously” with the transmission of the determining first data signal. For instance, in the event of a delay, targeting players that are moving about the game space in real time would be much more difficult. (Ex. 1004 at [0006]-[0013], [0035]-[0043], [0053].) Grams thus discloses or renders this limitation obvious.

14. Dependent Claim 21 Is Obvious

100. Claim 21 of the '301 recites:

The method of claim 15, further comprising: receiving a second data signal from the second mobile device; determining a second change in the display of the first mobile device based at least in part on the second data signal.

101. Grams discloses this limitation. Indeed, as demonstrated in discussions concerning claims 1 and 15, Grams concerns a location aware video gaming system where players are able to target and fire upon one another using devices with similar structure and capabilities. The Grams system describes a gameplay scenario where the various mobile devices in the game are equal participants. (*See, e.g.*, Ex. 1004 at Fig. 1 (depicting gameplay participants as equivalent); (Ex. 1004 at [0006]-[0013], [0035]-[0043], [0053].)) The

mobile devices participating in the Grams multiplayer game may each be targeted by other mobile devices. (*Id.*) Notably, Grams' specification confirms that players may target others or that they may themselves be targeted. (*Id.*) Grams' GUI view may include, for instance, an indicator "presented with the icons 402, 404, 406 of those players who are in a position to target the first player who is using the station on which the GUI 400 is presented." (Ex. 1004 at [0053].) Additionally, a game participant may optionally select an interface mode where the icons they see are "limited to those players who are in a position to target the first player." (*Id.*) Indeed, one of skill in the art would have realized given the ability of the first player to target other players, the presence of an interface mode limiting the view to players that may target the first player demonstrates that the players are equal participants in the game. Specifically, the disclosure of this GUI demonstrates that the ability the player device to target other users is shared by those other users. Further, it would have been obvious to a person of skill in the art that the mobile devices or a server managing the game would determine, in the event of a second player firing his or her weapon, whether or not that player's attack results in a "hit" identically to how it would determine whether or not the first player's attack resulted in a

“hit.” Specifically, the disclosures provided throughout Grams provide no indication that the participant devices operate differently. (Ex. 1004 at [0058]-[0062].) Indeed, if the first player is “hit,” or if a “near miss” or “miss” occurs as a result of the second player’s weapon fire, the first player will receive a second data signal from that second player’s mobile device. Further, that second data signal will be used to determine a display change as provided about in claims 1 and 15. (Ex. 1004 at [0056]-[0061].) Additionally, as provided concerning claim 14, a server managing the game might receive the second data signal and determine the display change. (Ex. 1004 at [0006]-[0013], [0035]-[0043], [0053], [0058]-[0062].) As such, Grams discloses this limitation.

15. Dependent Claim 22 Is Obvious

102. Claim 22 of the ’301 recites:

The method of claim 21, wherein the second data signal comprises data corresponding to a display of the second mobile device.

103. Grams’ teachings also disclose or render this limitation obvious. As described above in connection with claims 1, 15 and 21, Grams is directed to a location based gaming system where players target one another based on their relative locations. Additionally, players are able to select and fire upon

a selected target. Further, the selected target may return fire. When the second player targets and returns fire to the first player, the signal transmitted constitutes a “second display signal” that corresponds to a display of the second mobile device. If the play associated with the second mobile device, for instance, successfully targets the first mobile device, the operation causes a hit indicator to be displayed on the screens of each device. Notably, the second data signal will correspond to the display of the second mobile device. Additionally, Grams contains an embodiment where a data signal from the second mobile device is first sent to a server controlling the game and that signal is then transmitted to the first device to indicate a hit has been successful. This signal also corresponds to the display of the second device. (Ex. 1004 at [0006]-[0013], [0035]-[0043], [0053], [0058]-[0062].) As such, Grams discloses or renders this limitation obvious.

16. Dependent Claim 23 Is Obvious

104. Claim 23 of the '301 recites:

The method of claim 21, wherein the change in the display of the first mobile device comprises outputting an image substantially the same as the display of the second mobile device.

105. Grams' specification also teaches this limitation. For instance, as discussed concerning claims 1, 15 and 21, Grams is directed to a location based game with that provides players with the ability to identify and target one another based on location. Additionally, targeted players may return fire. Notably, in viewing Grams' specification one of skill in the art would have appreciated that the first and second mobile devices possess the same in-game capabilities (including the ability to target other players and be targeted by other players). (Ex. 1004 at [0058]-[0062].) Importantly, the second mobile device can successfully target the first mobile device after being fired upon and thereby transmit a second data signal that results in a change in the display of the first mobile device that is substantially the same as the change in display the second device exhibited when it was targeted. Indeed, a person of skill in the art would appreciate the benefits of providing both players with the same notification. Specifically, this would allow players to be as up to date as possible with respect to the state of play and would provide the same information to all players. (Ex. 1004 at [0006]-[0013], [0035]-[0043], [0053], [0058]-[0062].) As such, Grams discloses or renders this limitation obvious.

17. Dependent Claim 24 Is Obvious

106. Claim 24 of the '301 recites:

The method of claim 21, further comprising: determining a haptic effect based at least in part on the second data signal; and transmitting a haptic signal associated with the haptic effect to an actuator configured to output the haptic effect.

107. The Grams system also discloses or renders this limitation obvious. Notably, as described above in claims 1, 15 and 21-23, Grams' system is a location based gaming system that allows players to target and fire upon opposing players based on relative location. Additionally, targeted players may return fire. Grams' system may result in a second data signal being transmitted from the second mobile device in the event of a "hit," "miss," or "near miss." These messages may result in a haptic effect that is determined based on the second data signal. Additionally, it would have been obvious to a person of skill in the art that the first player's device, upon receiving the second data signal, could transmit a haptic signal to an actuator configured to process the signal and output the haptic effect. The reception of a signal and the associated processing of that signal to generate a haptic effect were both well-known operations in mobile communications at the time of

Grams' filing. (Ex. 1004 at [0009], [0012], [0056], [0058]-[0062], Cls. 3-5, 14-16 and 21-22.) Furthermore, the user of actuator based haptic feedback as a form of notification in mobile devices was commonplace at the time of Grams' filing. Additionally, one of skill in the art would know that a device processor's ability to generate a haptic signal to cause a haptic effect would be the most conventional way for a typical mobile communication device to cause a haptic effect. Grams thus discloses or renders this limitation obvious

18. Independent Claim 27 Is Obvious

(1) Preamble: Grams discloses a system with a processor.

108. Claim 27 of the '301 describes a system containing a processor configured to process inputs from a movement sensor, an interaction sensor and a network interface. Additionally, the processor must be configured to determine a display change based on the network and interaction signals. Finally, the system must determine a haptic effect based on the network signal. Grams disclose each limitation of this claim. Indeed, preamble of the claim requires "a system comprising: a processor configured to" carry out the additional limitations of the claim. Grams' system discloses "[a] processor 216 can be provided for processing gaming software 218, as well

as performing other processing functions.” (Ex. 1004 at [0041].) Figure 2 depicts an exemplary system:

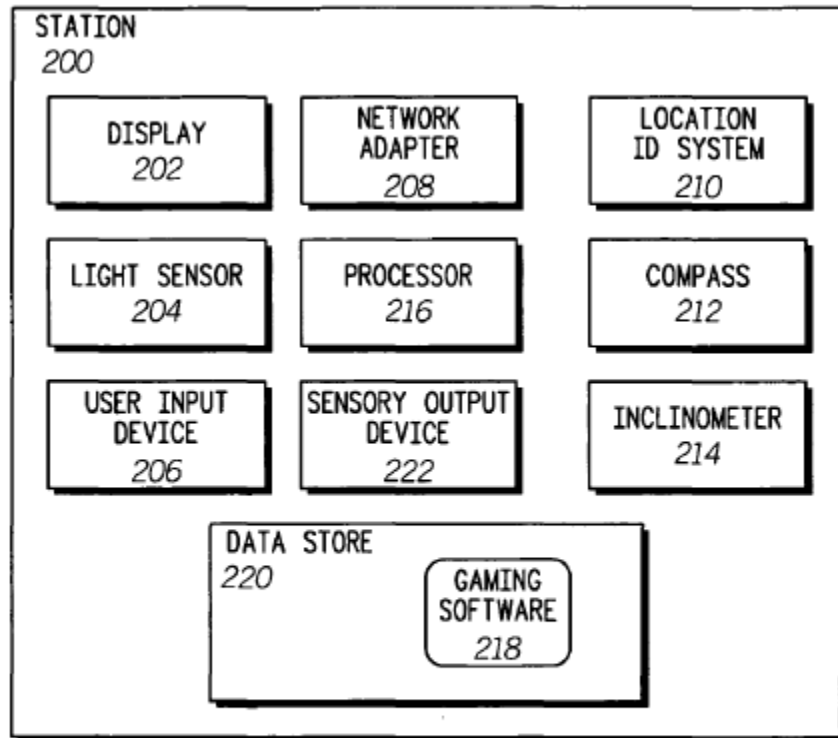


FIG. 2

(Ex. 1004 at Fig. 2.) Further, as will be described below, Grams’ processor is configured to carry out the remaining limitations of the claim.

(2) Element 27[a]: Grams discloses a processor configured to “receive a first sensor signal from a first sensor, the first sensor configured to detect a movement of a first mobile device.”

109. Element 27[a] of the '301 Patent requires a processor configured to “receive a first sensor signal from a first sensor, the first sensor configured to detect a movement of a first mobile device.” As set out above in reference to elements 1[a] and 15[a], Grams discloses a mobile device with a location identification system and a direction/orientation identification system that has sensors for location, orientation, and tilt, which represent movement of a first mobile device. (*See* elements 1[a] and 15[a]; Ex. 1004 at [0007], [0038]-[0040], Fig. 2.) These motion sensors generate associated sensor signals, as sensors in electronic systems generally do. The sensors transmit these signals to the processor, which controls the devices in Grams, and runs the software and performs the calculations required to run and play the game of Grams. (*Id.*; Ex. 1004 at [0032], [0061].) A person of skill in the art would appreciate that these device components are coupled to the device processor, which processes their associated data. Indeed, as with conventional communication devices, “[t]he processor 216 can be communicatively connected to any of the station components to receive, process and generate data in accordance with the requirements of gaming

software 218. For instance, the processor can receive location data from the location identification system 210, receive direction data from the compass 212, receive inclination data from the inclinometer 214, and process such data to generate a GUI that is presented on the display 202.” (Ex. 1004 at [0041].) As such, Grams discloses this limitation.

(3) Element 27[b]: Grams discloses a processor configured to “receive a second sensor signal from a second sensor, the second sensor configured to detect an interaction with the first mobile device.”

110. Element 27[b] of the ’301 Patent requires a processor configured to “receive a second sensor signal from a second sensor, the second sensor configured to detect an interaction with the first mobile device.” As set forth in discussing claims 9, 10, 11 and element 15[b], Grams’ mobile devices include a processor that is configured to detect a second sensor signal from a variety of different sensors configured to detect user interaction. Indeed, Grams’ specification states that its mobile devices may include a “user input device 206 [that] can include a keypad, a touch pad, buttons, switches, sensors, and/or any other devices which can be used to receive user inputs.” (Ex. 1004 at [0036]; *see also, id.* at [0064], Fig. 2.) A Grams mobile device may feature one or more of these user input devices and a connected processor that is configured to receive a second sensor signal from the user interface

device. Given that these user input mechanisms are each conventional elements for device interaction, a person of skill in the art would have appreciated that a player could use these components to interact with his or her device. One of skill in the art would have appreciated that these components are also sensors capable of generating a second sensor signal and transmitting the same to the processor. As such, Grams satisfies this limitation.

(4) Element 27[c]: Grams discloses a processor configured to “receive a first data signal from a network interface, the network interface configured to receive signals transmitted by a second mobile device.”

111. Element 27[c] of the '301 Patent requires a processor configured to “receive a first data signal from a network interface, the network interface configured to receive signals transmitted by a second mobile device.” As set for in connection with claims 1 and 15, Grams describes a game where players aim and fire virtual weapons at one another. As also described in concerning claims 1 and 15, when a targeting player successfully registers a “hit,” “miss,” or “near miss,” a first data signal conveying the result of the targeting can be transmitted to the targeted device (first mobile device) from the targeting device (second mobile device). (Ex. 1004 at [0058]-[0062].)

112. The targeted device receives the first data signal using its network interface. Grams' specification describes mobile stations including "a wireless network adapter 208 for transmitting and receiving data from the access points, or from other stations." (Ex. 1004 at [0037].) Specifically, Grams' specification states that the wireless network adapter of the mobile stations "can support IEEE 802 wireless communications, WPA, WPA2, GSM, TDMA, CDMA, DoCoMo, direct wireless communication, or any other communications protocol implemented in the communications network." (*Id.*) Additionally, the specification notes that the mobile devices have network interfaces that "can be linked via a communications network having access points, or linked via direct wireless communications." (Ex. 1004 at [0058].)
113. I have reviewed Immersion's proposed claim constructions in the related district court case. If the patent owner suggests that this claim limitation is properly read to require "[a] set of data that relates to a user interaction with a touch-sensitive interface of a mobile device," similar to the district court position taken, one of ordinary skill in the art would not read this limitation this way, because there is no requirement in the language of the limitation that restricts the first data signal in such a way. (Ex. 1014 at 7.) However,

as discussed with respect to element 15[d], Grams teaches the ability for the targeted device to receive a first data signal that is associated with user interaction. (Ex. 1004 at [0043], [0056], [0058]-[0062].) Given this disclosure, Grams discloses this limitation.

(5) Element 27[d]: Grams discloses a processor configured to “determine a change in a display signal based at least in part on the first data signal and the second sensor signal.”

114. Element 27[d] of the '301 Patent requires a processor configured to “determine a change in a display signal based at least in part on the first data signal and the second sensor signal.” As discussed in connection with elements 1[b] and 15[c], the targeted device in the Grams system may determine a display change based on the registration of a “hit,” “miss,” or “near miss,” serves as a “first data signal” as provided in element 27[c]. (Ex. 1004 at [0041].) As such, the visual notification is based at least in part upon the first data signal indicating the result of the targeting and firing. The first data signal is received by the targeted device (first mobile device) and processed by its processor to determine the display change. *See also* Ex. 1004 at Fig. 2:

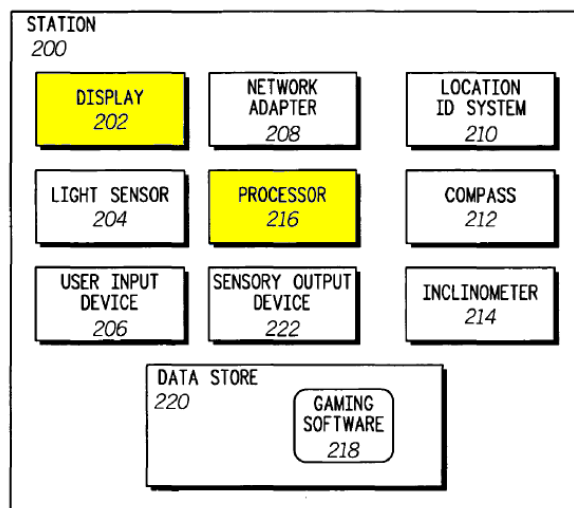


FIG. 2

115. The display change experienced is also based on a second sensor signal received based on the user's interaction under the reading of the claims undertaken by the patent owner. I have reviewed the related district court complaint as well as the infringement contentions Immersion served in the related district court case concerning the '301 patent. These documents indicate that Immersion interprets this claim such that the second sensor signal is met by a user's interaction that sets up a later display change that may or may not take place depending on the outcome of intervening events. In this instance the display change is not directly based on the second sensor signal. (Ex. 1006 at 20-23; Ex. 1007 at 21-24; Ex. 1008 at 19-23; Ex. 1009 at 20-25; Ex. 1010 at 21-25; Ex. 1011 at 25-29; Ex. 1012 at 17-22.; *see also*

Ex. 1013 at ¶ 68. (“The Fitbit Blaze is configured such that using the Run menu on the Fitbit Blaze, [a] user can execute the Run exercise tracker, a cue will be displayed on the Blaze screen accompanied by a vibration effect produced by the vibration motor of the Fitbit Blaze under the control of the processor (i.e., haptic output) once the user reaches Run Cue goals.”))

Importantly, Immersion takes the position that a user interaction that “***sets up the [] tracking exercise***” *app* on an accused device, such that under the right circumstances (if the appropriate fitness goal is met), a visual notification will appear on the device. (Ex. 1006 at 20 (“the user’s interaction or navigation...that sets up the a [sic] tracking exercise or steps taken.”); Ex. 1007 at 21 (the user’s interaction or navigation...that sets up the a [sic] tracking exercise.”); Ex. 1008 at 19 (“the user’s interaction or navigation...that sets up the a [sic] tracking exercise.”); Ex. 1009 at 20 (“the user’s interaction or navigation...that sets up the a [sic] tracking exercise, steps taken, or Run Cue.”); Ex. 1010 at 21 (“the user’s interaction or navigation...that sets up the a [sic] tracking exercise.”); Ex. 1011 at 25 (“the user’s interaction or navigation...that sets up the a [sic] tracking exercise, steps taken, or Run Cue.”); Ex. 1012 at 17 (“the user’s interaction or navigation...that sets up the a [sic] tracking exercise, steps taken, or Run

Cue.”).) Under such a reading, one of skill in the art would appreciate that the mobile device’s processor determines a change in a display signal based at least in part on the second sensor signal because the targeted user interacts with his or her device upon making the decision to enter the game and expose themselves to enemy fire. As such, Grams discloses this limitation. Further, even aside from Immersion’s infringement arguments, it would have been incredibly obvious to change Grams so that the system requires the receiving user to provide a user input before the visual “hit,” “miss,” or “near miss” notification is actually displayed to the screen and to the user. This sort of user interaction had been used for many years in mobile phones to create display changes related to incoming data signals only when the receiving user interacts with the device, *e.g.*, to accept an incoming call (which then causes a display change) or to view an incoming text or email (which then causes a display change). One of skill in the art would have readily known that the system of Grams could be modified so that instead of having the recipient device automatically display the message regarding the game event, it could do so only when the receiving user interacts with his or her device to tell it to do so.

(6) Element 27[e]: Grams discloses a processor configured to “determine a haptic effect based at least in part on the first data signal.”

116. Element 27[e] of the '301 Patent requires a processor configured to “determine a haptic effect based at least in part on the first data signal.” Indeed, as discussed above in connection with claims 1 and 15, the processor of the targeted device in the Grams system determines and outputs a haptic effect where a “hit,” a “miss” or a “near miss” has been registered. (Ex. 1004 at [0041], [0047], [0056].); *See also* Ex. 1004 at Fig. 2:

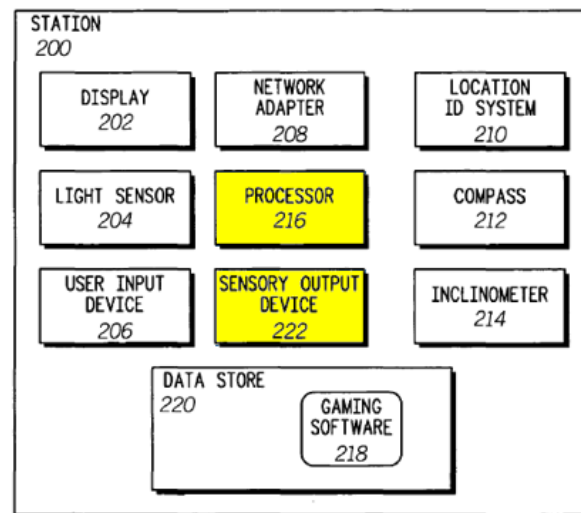


FIG. 2

As such, Grams satisfies this limitation. (*Id.* [0009], [0012], [0056], [0058]-[0062], Cls. 3-5, 14-16 and 21-22.)

(7) Element 27[f]: Grams discloses “outputting the haptic effect.”

117. Element 27[f] of the '301 Patent requires a processor configured for “outputting the haptic effect.” As discussed above concerning element 27[e], the processor of a mobile device in the Grams system determines the haptic effect and outputs that effect such that the targeted device vibrates when a “hit,” “miss,” or “near miss” is detected by the device. (Ex. 1004 at [0058]-[0062].) As such, Grams discloses this limitation.

19. Dependent Claim 28 Is Obvious

118. Claim 28 of the '301 recites:

The system of claim 27, wherein

the first sensor and the second sensor are each configured to detect one or more of: contact, pressure, acceleration, inclination, inertia, or location.

119. The system described in Grams discloses this limitation as well. As provided in connection with claims 1, 15 and 27, Grams' mobile devices may include a movement sensor for use in targeting that “can be a digital tilt sensor,” which can be “an accelerometer ASIC . . . or any other device suitable for sensing inclination.” (Ex. 1004 at [0040]; *see also, id.* at [0007], [0033], [0041], [0060].) Additionally, Grams' mobile devices contain a positioning system. That “positioning system can be, for instance, a global

positioning system (GPS) or a local positioning system.” (Ex. 1004 at [0007]; *see also, id.* at [0038]-[0041].) As such, Grams’ mobile devices teach a first sensor configured to detect inclination and acceleration as well as a first sensor that detects location.

120. Grams discloses several user input mechanisms. Indeed, as discussed concerning claims 1, 15 and 27, Grams’ mobile device “can include user input controls 702, for instance buttons and/or touch pads, for receiving user inputs, and an adjustable display 704 can be provided to present the GUI.” (Ex. 1004 at [0064]; *see also, id.* at [0036].) Notably, a person of skill in the art would know that these input mechanisms detect contact and pressure. These input mechanisms are each conventional user interface elements that were common at the time of Grams’ filing. Specifically, Grams discloses a second sensor that can detect contact and pressure, because buttons and touch pads can sense contact and pressure from a player’s finger.

20. Dependent Claim 29 Is Obvious

121. Claim 29 of the ’301 recites:

The system of claim 27, wherein
the second sensor comprises a touch-screen.

122. As discussed above in connection with claim 4, using a touch-screen display as a user-input mechanism and touch-sensitive user interface in Grams was obvious. The touch screen would of course have an associated sensor, which would generate a sensor signal, as essentially all touch screens do.

21. Dependent Claim 31 Is Obvious

123. Claim 31 of the '301 recites:

The system of claim 27, wherein

the processor is further configured to transmit a second data signal to the network interface, and the network interface is further configured to transmit the second data signal to the second mobile device.

124. The system described in Grams discloses this limitation as well. As provided in connection with claims 21-24, Grams' mobile devices are reciprocal in nature and equal participants in the game described. (Ex. 1004 at [0006]-[0013], [0035]-[0043], [0053], [0058]-[0062].) The targeted device (in this instance, the first mobile device) may target the device that initially targeted it (in claim 27, the second mobile device). The first mobile device may then transmit a second data signal upon determination of a "hit," "miss," or "near miss" of the second mobile device. This capability is identical to that of the second mobile device of claim 27 that transmits a first

data signal when it targets the first mobile device. The first mobile device transmits the second data signal using its network interface and it transmits to the network interface of the second mobile device, similar to the interaction described in reverse in connection with claim 27.

125. I have reviewed Immersion’s proposed claim constructions in the related district court case. If Immersion takes the position that the second data signal constitutes “[a] set of data that relates to a user interaction and a movement of a mobile device,” as they have in the district court, I disagree, because a person of ordinary skill would not read the limitation this way, because there is no requirement in the language of the limitation that restricts the first data signal in such a way. (Ex. 1014 at 8.) However, as discussed in connection with element 15[d], the targeting device (here, and in claim 15, the “first mobile device”) can transmit a data signal (second data signal) related to a user interaction and a movement of the targeting device to the targeted station (here and in claim 15, the “second mobile device”). As such, Grams discloses this limitation.

VII. Conclusion

126. I, Majid Sarrafzadeh, hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct, and


Declaration of Majid Sarrafzadeh Under 37 C.F.R. § 1.68 in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 8,638,301

that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both. *See* 18 U.S.C. § 1001.

Declaration of Majid Sarrafzadeh Under 37 C.F.R. § 1.68 in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 8,638,301

Date: February 7, 2018

Respectfully submitted,



Majid Sarrafzadeh