FIG. 1

Abstract: A distributed electronic game system that includes a flat multi-touch functional central display that is capable of receiving wireless signals from surrounding game input devices, interpreting control actions from the wireless signals, and affecting game state in response to the control actions. The central display may be positioned horizontally and may act as a central play area for circle games. The central display includes general-purpose processing capability allowing the central display to be a central play area for a wide variety of board games and other circle games. The surrounding game input devices might be an orientation sensing game input device or may be private player consoles, or other game pieces.
Published:

- 'the international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))
WIRELESSLY DISTRIBUTED ELECTRONIC CIRCLE GAMING

BACKGROUND

Games have provided a social context in which people can interact and have fun. One type of game that is particularly engaging socially are "circle" games, where players will gather around a central horizontal play area that is visible to all players, and interact with the central horizontal play area and with each other. Such players are often as few as two (as is the case with chess or checkers), but may be as many as a dozen or more. Board games are circle games in which the board serves as the central horizontal play area. However, there are other circle games that have a central play area that is not a board. For instance, many card games can be played directly on the surface of a table or other flat surface. Many circle games involve the players manipulating objects on or proximate the play area. For example, many circle games require the player role dice, start a timer, spin a spinner, play cards, move pieces, and so forth, depending on the game. Many circle games also involve the user maintaining a private area that is viewable to only the player (and perhaps fellow team members).

Circle games have existed for thousands of years across diverse cultures. New circle games arise to meet the social needs and interests of the community while old circle games go out of use as society loses interest. Many believe that circle games provide significantly more opportunity for social development than other types of conventional video games that are gaining in popularity. The contribution of circle games to society should not be ignored, but often is.

Circle games can provide an impetus for bringing families, friends, and other significant social groups together and fostering important human relationships. Children wait with great eagerness to engage with others in circle games. The types of circle games that individuals enjoy may change as one grows older, and may differ between population segments. Nevertheless, circle games draw human beings together with the immediate hope of engaging others in a test of skill, while the horizontal play area provides a subtle and significant side-benefit in permitting channels of communication to be opened. Many have experienced that the conversation migrates to topics beyond the scope of the game itself, often resulting in a level of conversation that is greater than particular individuals might be inclined to
engage in without the circle game. The benefit to society in encouraging individuals to come together in circle games is often underestimated and not fully recognized.

**BRIEF SUMMARY**

Embodiments described herein relate to a distributed electronic game system that includes a flat multi-touch functional central display that is capable of receiving wireless signals from surrounding game control devices, interpreting control actions from the wireless signals, and affecting game state in response to the control actions. The central display may be positioned horizontally and may act as a central play area for circle games. In one embodiment, the central display includes general-purpose processing capability allowing the central display to be a central play area for a wide variety of board games and other circle games.

In one embodiment, the surrounding game control device might be a wireless game input device that includes an orientation sensor whose orientation affects game state. Information regarding the orientation is transmitted from the game input device itself to the central display, thereby controlling game state in the central display. One example of a wireless game input device is a die. When a die is rolled, the die may transmit information regarding its orientation to the central display, allowing the central display to determine what number was rolled, or more generally, which side is facing up. In one embodiment, a recharger is provided for recharging a power source of the die or other wireless game input device.

Alternatively or in addition, the surrounding game control devices might be one or more player consoles, each displaying private game state associated with a subgroup of one or more players. Such players may physically interact with the player console to thereby control game state at the central display. A subset of one or more of the player consoles may be specialized game consoles, such as that of a game master, allowing for specialized control of the game state itself, or which portion of the game state is displayed at the central display.

This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.
BRIEF DESCRIPTION OF THE DRAWINGS

In order to describe the manner in which the above-recited and other advantages and features can be obtained, a more particular description of various embodiments will be rendered by reference to the appended drawings. Understanding that these drawings depict only sample embodiments and are not therefore to be considered to be limiting of the scope of the invention, the embodiments will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

Figure 1 abstractly illustrates a distributed electronic game system;
Figure 2 illustrates a more concrete example of the central display of Figure 1;
Figure 3 abstractly illustrates an orientation-sensing game input device that may be an example of a game input device of Figure 1;
Figure 4 illustrates a specific concrete example of an orientation-sensing game input device in the form of an orientation-sensing die;
Figure 5 abstractly illustrates a player console that represents an example of a game input device of Figure 1;
Figure 6 illustrates a concrete example of a player console;
Figure 7 illustrates another concrete example of a player console in the form of a game master player console;
Figure 8 illustrates a computing system architecture in which the principles described herein may be employed in at least some embodiments; and
Figure 9 illustrates a wireless die recharger that may be used to recharge the wireless die of Figure 4.

DETAILED DESCRIPTION

The principles described herein relate to and/or may be used in a distributed electronic game system. Figure 1 abstractly illustrates a distributed electronic game system 100.

The system 100 includes a flat multi-touch functional central display 101. The central display 101 may be laid horizontally on a table or other surface and may be used as a horizontal central playing surface. For instance, the central display 101 may behave as an electronic board of a digital board game. The display 101 may be
movable, or perhaps may be fixed, perhaps being built into a furniture item. Since Figure 1 is abstract, the various components illustrated as being included within the central display 101 should not be construed as implying any particular shape, orientation, positioning or size of the corresponding component. Subsequent figures will illustrate a more concrete representation of an example of the central display 101.

The system 100 also includes surrounding game control devices (also called herein "game input device"). There are eight such game input devices 102A through 102H illustrated in Figure 1, although the ellipses 102I represents that there may be less than or greater than eight game control devices. The surrounding game input devices 102A through 102I may be referred to generally as game control devices 102 or game input devices 102. The game input devices 102 are each represented abstractly as rectangles although they will each have a particular concrete form depending on their function and design. Example forms are described further below. The game input devices 102 may be orientation-sensitive game input devices, player consoles, or a combination thereof.

The flat multi-touch functional central display 101 is capable of detecting and responding to multiple simultaneous instances of players touching the display 101, and affecting game state in response to each touch instance. The central display 101 may also have a scratch resistant coating to prevent scratching that might otherwise be caused by players touching the central display 101. The central display 101 may also receive signals from the surrounding game input devices 102, interpret control actions from the signals, and affect game state in response to the control actions.

In one embodiment, one, some, or even all of the game input devices 102 are wireless. In the case of a wireless input device, the wireless input device may communicate wirelessly with the central display 101. One or even some of the game input devices 102 may be remotely located from the central display 101. Such remotely located game input device(s) may perhaps communicate with the central display over a Wide Area Network (WAN) such as the Internet. That would enable a player to participate in the game being displayed on the central display 101 even if that player is located in a completely different part of the globe. Thus, for example, a father or mother stationed oversees might play a child's favorite board game with
their child before going to bed. Or perhaps former strangers and new friends from
different cultures around the globe might engage in a board game, potentially
fostering cross-cultural ties while having fun. That said, perhaps all of the game input
devices 102 may be local (e.g., in the same room) to the central display 101.

The central display 101 includes a public display area 111. Note that the
public display area 111 is only abstractly represented in Figure 1, and is thus not
drawn to scale. In a preferred embodiment, the public display area 111 would
actually occupy a substantial majority of the viewable surface of the central display
101 when the display 101 is laid horizontally, and thus emulate a board-like play area.
The public display area displays game information that should be viewable by all of
the players and is thus deemed "public". That said, there is no required form for the
central display 101. The central display 101 might have any size or configuration.

The central display 101 also includes game logic 112 that is capable of
rendering all or at least a portion of the public game state 113 on the public display
area. A reception mechanism in the form of wireless transceiver 114 receives control
information from surrounding game input devices 102. A game incorporation
mechanism 115 identifies the control information received from the game input
devices 102 and alters a game state based on the control information.

In one embodiment, the central display 101 incorporates functionality of a
general-purpose computing system with a hard drive 121, memory 122, general-
purpose processor(s) 123, speakers 124, a video driver 125, a wireless transceiver 126
(such as a BLUETOOTH® transceiver), and so forth (see ellipses 127). In that case,
the game logic 112, portions of the reception mechanism 114 stack, and the game
incorporation mechanism 115 may be software-implemented. The game state 113
may be represented as data within the hard drive 121, memory 122 and/or video
driver 125. The wireless transceiver 126 is capable of receiving multiple signals
simultaneously.

Figure 2 illustrates a more concrete example 200 of the display 101 of
Figure 1. The display 200 includes the public display area 211 that represents an
element of the public display area 111 of Figure 1. The displayed public game state
may be associated with any type of game, and may render game state in response to
instructions provided by the video driver 125. In one embodiment, the video driver
125 may, in response to commands from the game logic, display cinematic game introductions and/or scene transitions to help entice the players into a richer playing experience. The video driver 125 may also display a cinematic conclusion that may depend on a result of the game.

In the display 200, there are a number of built-in cameras 212A through 212H (referred to collectively as "cameras 212"). In this case, there are eight illustrated cameras (two on each of the four sides of the display 200), although the display 200 may have any number of cameras. The cameras 212 are each capable of capturing a video image and may be adjustable. Thus, for example, in a game with eight local players, each camera may be adjusted to capture the video of a corresponding player. The display 200 may include logic that renders the captured video, or portions thereof, on the public display area 211 of the display 200. The logic might also cause all or portions of that video to be transmitted to game input devices (such as player consoles) so that the video may also be displayed at the various game input devices. In one embodiment, the cameras may fold into the display 200 edge. For instance, in Figure 2, the cameras 212A, 212B, 212E and 212G are illustrated in contracted collapsed (inactive) position within the display 200, whereas the cameras 212C, 212D, 212F and 212H are illustrated in extended position ready to capture video.

Figure 3 abstractly illustrates an orientation-sensing game input device 300. As mentioned above, the surrounding game input devices 102 of Figure 1 may be orientation-sensing game input devices, player consoles, game master consoles or a combination thereof. Figure 3 is an example of such an orientation-sensing game input device. Once again, Figure 3 is abstract. Accordingly, the various components illustrated as being included within the orientation-sensing device 300 should not be construed as implying any particular shape, orientation, positioning or size of the corresponding component. Subsequent figures will illustrate a more concrete representation of an example of the orientation-sensing game input device 300.

The orientation-sensing game input device 300 includes an orientation sensor 301 that, when active, outputs a spatial orientation signal representing a spatial orientation of the game input device. The orientation sensor 301 is rigidly attached to the game input device 300. The orientation sensor 301 is able to detect how the game...
input device 300 is oriented with respect to vertical, and/or how the game input device is oriented with respect to north. In one embodiment, the orientation sensor 301 is an accelerometer. Alternatively or in addition, the orientation sensor 301 may be a compass that generates a direction signal indicating a geographical orientation. The orientation-sensing device may also potentially have a Global Positioning System (GPS) that allows the orientation-sensing device 300 to detect a global position of the orientation-sensing device 300 in global coordinates.

A transmission mechanism 302 is communicatively coupled to the orientation sensor 301 so as to receive the spatial orientation signal from the orientation-sensor 301 and transmit spatial orientation information present in the spatial orientation signal to the flat multi-touch functional display 101. In one embodiment, the transmission mechanism 302 may accomplish this using acoustics, but preferably accomplishes this using wireless electro-magnetic radiation. A suitable protocol for transmission of the spatial orientation information is BLUETOOTH®. As an example, if the orientation-sensing device 300 is a multi-sided die, and if the orientation sensor 301 is a tri-axial accelerometer, the spatial orientation signal may indicate or at least include enough information to infer which side of the die is facing up. As another example, if the orientation-sensing device is a playing card or a coin, and if the orientation sensor is a uni-axial accelerometer, the spatial orientation signal may indicate or at least include enough information to infer whether the playing card is face up or face down, or which side of the coin is facing up. As a final example, if the orientation-sensing device 300 is a domino tile, and the orientation sensor 301 is an accelerometer, the spatial orientation signal may convey whether the domino tile were face up or face down. Furthermore, if the orientation sensor 301 is also a compass, the spatial orientation signal may convey which direction the domino was oriented on the table.

The transmission mechanism 302 may also transmit other useful information. For instance, the transmission mechanism may transmit a locally-unique and perhaps globally-unique identifier. This may be especially useful in a case where there are multiple orientation-sensing devices 300 being used in a game. For instance, if the orientation-sensing devices 300 were each six-sided die, the central device
could confirm what die was rolled, and the associated rolled value of that specific die, even if multiple dice were rolled.

The orientation-sensing device 300 might also transmit other information identifying characteristics of the device 300. For instance, if the device 300 were a coin, the device 300 might transmit a device type identifier that identifies the device as a coin, and so forth for other types of devices. The device 300 might also transmit information from which the central device might infer other characteristics of the device as well, such as color, size, shape, which might be helpful where such characteristics have an impact on game state.

In one embodiment, the device 300 might transmit information that helps the central display interpret the impact on the game of the orientation of the device 300. For instance, one die might have a quality of 36 in which the actual value input by the roll result is to be 36 times the number rolled. Such quality information may be included with the transmission. In one embodiment, the transmission mechanism 302 includes a reliable transmission mechanism in which transmissions are acknowledged by the central display, or else the information is retransmitted according to a particular protocol.

There are many example game input devices that may incorporate orientation-sensing capability with suitable modification in accordance with the broad scope of the principles described herein. Several examples have already been given including a multi-sided die, a playing card, a coin, and a domino tile. Other examples include, but are by no means limited to, the following:

1) a game piece miniature;
2) bottle caps;
3) plastic bone pieces;
4) cans;
5) tokens;
6) blocks;
7) house or hotel pieces;
8) marbles;
9) jewels;
10) treasure chest lid;
11) jelly beans;
12) checker pieces;
13) any type of wood game piece;
14) any type of plastic game piece;
15) any type of metallic game piece;
16) and many more.

The presentation of this list is not intended to provide an exhaustive enumeration of the types of orientation-sensing game input devices that may be used consistent with the principles herein. The principles described herein may be applied in any game input device whose orientation has some impact on a game state. Since the types of games are limitless, and subject only to the limits of the human imagination, the types of orientation-sensing game input devices that may be altered to incorporate the features described herein are likewise limitless.

A specific concrete example of an orientation-sensing game input device will now be described with respect to Figure 4, which illustrates an orientation-sensing die 400. In the illustrated case, the orientation sensing die 400 is a six-sided die. However, the principles described herein may be applied to any die, regardless of the number of sides. For instance, some die have as few as only four sides. Some commercially available die have as many as 100 sides.

Referring to Figure 4, the die includes a multi-sided body 401 having at least four flat sides; (in the illustrated example six sides). For clarity, the image on each itself (often, but not always a certain number of distributed dots) is not illustrated such that some of the internal-embedded components may be more easily seen. That said, the various components are not necessarily drawn to size since the precise size and positioning of the components is not critical, so long as the components fit within the boundaries of the die. Furthermore, if the die is desired to be kept random, the components should be distributed appropriately to keep the center of gravity in the middle of the cube.

An orientation sensor 411 (such as a tri-axial accelerometer) is embedded within the multi-sided body 401 and is structured to, when active, output a spatial orientation signal representing a spatial orientation of the game input device. A transmission mechanism 412 is also embedded within the multi-sided body 401 and
communicatively coupled to the orientation sensor 411 so as to receive the spatial orientation signal and transmit spatial orientation information present in the spatial orientation signal to locations external to the multi-sided body. In one embodiment, the orientation sensor 411 and the transmission mechanism 412 are a single integrated BLUETOOTH® - enabled tri-axial accelerometer.

An electronic power source 413 is also embedded within the multi-sided body 401 and is coupled to the orientation sensor 411 and the transmission mechanism 412 so as to electronically power the orientation sensor 411 and the transmission mechanism 412. In one embodiment, the electronic power source 413 includes a rechargeable battery. There may be a plurality of electrical contacts 414A and 414B accessible from the outside of the multi-sided body 401, each establishing a corresponding electrical path 415A and 415B from the outside of the multi-sided body to the rechargeable battery. The electronic power source 413 may also be an insertable and removable battery and may even perhaps be disposable. In one embodiment, the electronic power source 413 is a non-rechargeable disposable battery that is not removable from the die. In that case, the entire die may be considered disposable, or at least converts to a normal non-transmitting die after the battery fails. In the case of a non-rechargeable battery, there would be no need for the electrical paths 415A and 415B. In the case of a removable battery, the die may have a cavity that fits the battery, and that is accessed by removing a cover that snaps into place.

A status indicator 416 may also be included and may be visible from external to the multi-sided body 401. For instance, the status indicator 416 may be on the surface of the die 400. If the multi-sided body 401 is composed of translucent material, the status indicator 416 may also be embedded within the multi-sided body 401 itself. If necessary or desired, a counterweight 417 may also be positioned rigidly within the multi-sided body 401 so as to further center a center of gravity of the wireless die.

Figure 5 abstractly illustrates a player console 500. As previously mentioned, the game input devices 102 of Figure 1 may be player consoles, orientation-sensing devices, or combinations thereof. Figure 5 is an abstract illustration of a player console showing functional components of the player console 500. Once again, Figure 5 is abstract. Accordingly, the various components
illustrated as being included within the player console 500 should not be construed as implying any particular shape, orientation, positioning or size of the corresponding component. Figure 6 will illustrate a more concrete representation of an example of the player console 500.

Each player, or perhaps each player team, may have an associated player console, each associated with the corresponding player or team. The player console 500 includes a private display area 501 and game logic 502 capable of rendering at least a portion a private portion of game state 503 associated with the player (or team). The player or team may use an input mechanism 504 to enter control input into the player console. A transmission mechanism illustrated in the form of a transceiver 505 transmits that control information to the flat multi-touch functional display 101, where the control information is used to alter the game state at the central display. If the player console 500 is a wireless player console, the transceiver 505 would be a wireless transceiver. The control information may also be used to control the game state at the player console, as well as to update the private display area at the player console. The transceiver 505 may also wirelessly receive information from the central display 101. The transceiver 505 may even receive wireless information transmitted by surrounding orientation-sensing devices so that the game logic 502 may update the game state 503, and potentially also update what is displayed in the private display area 501. The transceiver 505 is capable of receiving multiple orientation-sensor signals at the same time. Thus, with a single roll of the dice, the game state at the central display as well as one or more player consoles may be updated.

Figure 6 illustrate a concrete example of a player console 600. Here, the private display area 601 displays the player's private information (in this case, several playing cards). The player console 600 also includes a barrier 602 to prevent other players from seeing the private game state displayed on the private display area 601. The private viewing area 601 may be touch-sensitive, allowing the player to interact with physical gestures on the private viewing area 601, thereby causing control information to update the rendering on the private display area, and the game states on the player console 600, as well as on the central display 101. The private display area 601 also, in this example, displays video images 603A, 603B and 603C of other
players. For instance, such images may have been captured by the cameras 212 (see Figure 2), causing the central display 200 to transmit the images to the player console.

In one embodiment, at least one of the player consoles is different from the remaining player consoles. Figure 7 illustrates such a player console 700. In this case, the player console might be a game master console 700, in which the game master may interface with the private viewing area to perhaps control game state. For instance, the game master may use physical gestures on the touch-sensitive display 701 of the game master console 700 to affect what is displayed on the central display 102. For instance, the game master might control what portions of the map are viewable on the central display 101. The game master might also control what effect another player's actions might have on the operation of the game logic, whether at the central display, or whether at one or more of the player consoles. The game master might also create a scenario and setting of a game using the game master console 700.

The distributed game system described herein thus allows circle games to be played electronically. Traditionally, it is often teenagers that lose interest in circle games. The wireless distributed game system appeals to a teenager's keenness for a sense of technology, which has the potential to pull teenagers back into the family circle games, potentially enriching family relationships and maintaining important lines of communication.

In one embodiment, the central display 101 has an Internet connection (represented generally by the ellipses 127 in Figure 1. During initial power-up of the central display, the central display may be configured to navigate to a predetermined set of one or more web sites, and may have a predetermined set of circle games installed already. The player might use the central display to navigate to a central web site that may be used to download software necessary to engage in other circle games. When a circle game is begun, the central device may inform the surrounding player consoles of the game that is about to begin and, if necessary, provide the appropriate software to the player consoles as well. In one embodiment, the player consoles are general-purpose computing devices with one or more processors, a memory, and potentially a hard disk.

Accordingly, a flexible game system has just been described. Having described the embodiments in some detail, as a side-note, the various operations and
structures described herein may, but need, not be implemented by way of a physical computing system. Accordingly, to conclude this description, an example computing system will be described with respect to Figure 8.

Figure 8 illustrates a computing system 800. Computing systems are now increasingly taking a wide variety of forms. Computing systems may, for example, be handheld devices, appliances, laptop computers, desktop computers, mainframes, distributed computing systems, or even devices that have not conventionally been considered a computing system. In this description and in the claims, the term "computing system" is defined broadly as including any device or system (or combination thereof) that includes at least one processor, and a memory capable of having thereon computer-executable instructions that may be executed by the processor. The memory may take any physical form and may depend on the nature and form of the computing system. A computing system may be distributed over a network environment and may include multiple constituent computing systems.

As illustrated in Figure 8, in its most basic configuration, a computing system 800 typically includes at least one processing unit 802 and memory 804. The memory 804 is a physical system memory, which may be volatile, non-volatile, or some combination of the two. The term "memory" may also be used herein to refer to non-volatile mass storage such as physical storage media. If the computing system is distributed, the processing, memory and/or storage capability may be distributed as well. As used herein, the term "module" or "component" can refer to software objects or routines that execute on the computing system. The different components, modules, engines, and services described herein may be implemented as objects or processes that execute on the computing system (e.g., as separate threads).

In the description above, embodiments are described with reference to acts that are performed by one or more computing systems. If such acts are implemented in software, one or more processors of the associated computing system that performs the act direct the operation of the computing system in response to having executed computer-executable instructions. An example of such an operation involves the manipulation of data. The computer-executable instructions (and the manipulated data) may be stored in the memory 804 of the computing system 800.
Embellishments within the scope of the present invention also include computer-readable media for carrying or having computer-executable instructions or data structures stored thereon. Such computer-readable media can be any available media that can be accessed by a general purpose or special purpose computer. By way of example, and not limitation, such computer-readable media can comprise physical storage and/or memory media such as RAM, ROM, EEPROM, CD-ROM or other optical disk storage, magnetic disk storage or other magnetic storage devices, or any other physical medium which can be used to carry or store desired program code means in the form of computer-executable instructions or data structures and which can be accessed by a general purpose or special purpose computer. Combinations of the above should also be included within the scope of computer-readable media.

Computer-executable instructions comprise, for example, instructions and data which cause a general purpose computer, special purpose computer, or special purpose processing device to perform a certain function or group of functions. Although the subject matter has been described in language specific to structural features and/or methodological acts, it is to be understood that the subject matter defined in the appended claims is not necessarily limited to the specific features or acts described herein. Rather, the specific features and acts described herein are disclosed as example forms of implementing the claims.

The components of the computing system 800 may, for example, be used to provide functionality to game logic 112 of Figure 1, store or remember game state 113, configure and communicate with transceiver 114, and operate the logic of game incorporation module 115. Each of the player consoles may also have a computing system such as computing system 800 guiding their processing needs.

Figure 4 illustrates a wireless die 400. However, the various components illustrated within the wireless die may be incorporated into any wireless game piece such as those enumerated above. In one embodiment, as mentioned above, the wireless die 400 is rechargeable. Figure 9 illustrates a wireless die recharger 900 that may be used to recharge the wireless die 400. The recharger 900 includes a recharger body 901 having a recharger receptacle 910A sized to receive a multi-sided die. If the recharger body is to charge some other wireless game piece, the receptacle 910A would instead be sized to receive that other wireless game piece. In the illustrated
case, the wireless die recharger 900 has four recharger receptacles 910 (including receptacles 910A, 910B, 910C and 910D) and thus is capable of recharging four six-sided die at a time. However, the recharger may be constructed to have any number of receptacles, where each receptacle may be sized for a six-sided die, or any other shaped die, or any other wireless game piece that is rechargeable.

Each receptacle 910 includes electrical contacts 911A and 911B, although they are only labeled in Figure 9 for receptacle 910A. A power source 912 provides recharging electrical power the electrical contacts 911A and 911B when a rechargeable battery is electrically coupled in the recharger receptacle between the electrical contacts. In other words, if a rechargeable wireless die is placed in the receptacle with its contacts contacting the contacts 911A and 911B of the receptacle, the rechargeable battery within the wireless die recharges. A cover 913 is configured to close onto the recharger body 911 so as to create a cavity defined by the cover and by the recharger receptacle that fits the multi-sided die. When the die are not in use, therefore, they may be recharged using the recharger 900.

The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.
CLAIMS

What is claimed is:

1. A distributed electronic game system comprising:

   a game input device; and

   a flat multi-touch functional display,

   wherein the game input device comprises:

       an orientation sensor that, when active, outputs a spatial orientation signal representing a spatial orientation of the game input device, wherein the orientation sensor is rigidly attached to the game input device;

       a transmission mechanism communicatively coupled to the orientation sensor so as to receive the spatial orientation signal and transmit spatial orientation information present in the spatial orientation signal to the flat multi-touch functional display.

   wherein the flat multi-touch functional display comprises:

       a reception mechanism configured to receive the spatial orientation information transmitted by the transmission mechanism; and

       a game incorporation mechanism configured to identify the spatial orientation of the game input device using the spatial orientation information received by the reception mechanism and alter a game state based on the spatial orientation information.

2. The distributed electronic game system in accordance with Claim 1, wherein the transmission mechanism transmits information using wireless electromagnetic radiation.

3. The distributed electronic game system in accordance with Claim 1, wherein the game input device is a multi-sided die.

4. The distributed electronic game system in accordance with Claim 1, wherein the game input device is a coin.

5. The distributed electronic game system in accordance with Claim 1, wherein the game input device is a game piece miniature.

6. The wireless game piece in accordance with Claim 1, wherein the body is composed of plastic in its majority.
7. The wireless game piece in accordance with Claim 1, wherein the body is composed of wood in its majority.

8. The wireless game piece in accordance with Claim 1, wherein the body is composed of metal in its majority.

9. The distributed electronic game system in accordance with Claim 1, wherein the orientation sensor is an accelerometer.

10. The distributed electronic game system in accordance with Claim 9, wherein the orientation sensor further comprises a compass that generates a geographical orientation signal indicating a geographical orientation of the game input device, wherein the transmission mechanism receives the geographical orientation signal and transmits geographical orientation information present in the geographical orientation signal to the flat multi-touch functional display.

11. The distributed electronic game system in accordance with Claim 1, further comprising:

   at least one player console, each associated with at least one, but less than all, of the players of the game, and comprising a private display area and game logic cable of rendering at least a portion a private portion of game state associated with the at least one player on the private display area, each player console comprising:

   an input mechanism capable of responding to physical input of the at least one player; and

   a transmission mechanism capable of transmitting input information representing the physical input of the at least one player to the flat multi-touch functional display.

12. The distributed electronic game system in accordance with Claim 11, wherein the player console also includes a reception mechanism that receives the spatial orientation information transmitted by the game input device, wherein the game logic of the player console affects what is displayed on the private display area depending on the received spatial orientation information.

13. The distributed electronic game system in accordance with Claim 1, wherein the transmission mechanism is further configured to transmit a locally unique identifier for the game input device.
14. The distributed electronic game system in accordance with Claim 1, wherein the transmission mechanism is further configured to transmit information regarding one or more characteristics of the game input device.

15. The distributed electronic game system in accordance with Claim 1, wherein the transmission mechanism is further configured to transmit information regarding a quality of the game input device.

16. The distributed electronic game system in accordance with Claim 1, wherein the game incorporation mechanism is configured to alter a game state at least under some circumstances using a combination of the spatial orientation information, and pressure detected on the flat multi-touch functional display.

17. A distributed electronic game system comprising:

   a flat multi-touch functional display comprising a public display area and game logic capable of rendering at least a portion of public game state on the public display area, and

   a player console associated with at least one, but less than all, of all of the players of the game, and comprising a private display area and game logic cable of rendering at least a portion a private portion of game state associated with the at least one player on the private display area,

   wherein the player-console comprises:

   an input mechanism capable of responding to physical input of the at least one player; and

   a transmission mechanism capable of transmitting input information representing the physical input of the at least one player to the flat multi-touch functional display, and

   wherein the flat multi-touch horizontal functional display comprises:

   a reception mechanism configured to receive the input information transmitted by the transmission mechanism; and

   a game incorporation mechanism configured to identify the physical input of the at least one player using the input information and alter a game state based on the input information.
18. The distributed electronic game system in accordance with Claim 17, further comprising:
   a plurality of player consoles including the player console, wherein each of the plurality of player console comprises:
   a private display area;
   game logic capable of rendering at least a portion a private portion of game state associated with a corresponding group of one or more players on the private display area;
   an input mechanism capable of responding to physical input of at least one player of the corresponding group of one or more players; and
   a transmission mechanism capable of transmitting input information representing the physical input of the at least one player of the corresponding group of at least one or more players to the flat multi-touch functional display.

19. The distributed electronic game system in accordance with Claim 18, wherein at least one of the plurality of player consoles is unique from the remaining of the plurality of player consoles.

20. The distributed electronic game system in accordance with Claim 19, wherein the at least one of the player consoles is a game master player console.

21. The distributed electronic game system in accordance with Claim 20, wherein the game master player console allows a game master to control a portion of the game state that is displayed on the flat multi-touch functional display.

22. The distributed electronic game system in accordance with Claim 20, wherein the game master player console allows a game master to control what effect another player's actions have on game logic.

23. The distributed electronic game system in accordance with Claim 20, wherein the game master player console allows a game master to create a scenario and setting of a game associated with the game state.

24. The distributed electronic game system in accordance with Claim 18, wherein for at least one of the plurality of player consoles, the transmission mechanism is a wireless transmission mechanism.
25. The distributed electronic game system in accordance with Claim 18, wherein for all of the plurality of player consoles, the transmission mechanism is a wireless transmission mechanism.

26. The distributed electronic game system in accordance with Claim 18, wherein for at least one of the plurality of player consoles is remotely located, wherein the transmission mechanism for one or more of the at least one of the plurality of player consoles is an Internet connection.

27. The distributed electronic game system in accordance with Claim 17, wherein the flat multi-touch functional display comprises a plurality of cameras capable of capturing a video image.

28. The distributed electronic game system in accordance with Claim 27, wherein the flat multi-touch function display includes logic that displays captured video from at least one of the plurality of cameras on the public display area of the flat multi-touch function display.

29. The distributed electronic game system in accordance with Claim 27, wherein the flat multi-touch function display is configured to transmit captured video from at least one of the plurality of cameras to at least one of the plurality of player consoles, wherein one or more of the at least one of the plurality of player consoles are configured to display at least some of the transmitted captured video in the private display area of the player console.

30. A wireless game piece comprising:
   a body;
   an orientation sensor embedded within the body and that is structured to, when active, output a spatial orientation signal representing a spatial orientation of the body of the wireless game piece;
   a transmission mechanism embedded within the body and communicatively coupled to the orientation sensor so as to receive the spatial orientation signal and transmit spatial orientation information present in the spatial orientation signal to locations external to the wireless game piece; and
   an electronic power source embedded within the body and coupled to the orientation sensor and the transmission mechanism so as to electronically power the orientation sensor and the transmission mechanism.
31. The wireless game piece in accordance with Claim 30, wherein the wireless game piece is a wireless die, and the body is a multi-sided body with at least four flat sides.

32. The wireless game piece in accordance with Claim 30, wherein the wireless game piece is coin.

33. The wireless game piece in accordance with Claim 30, wherein the wireless game piece is a game piece miniature.

34. The wireless game piece in accordance with Claim 30, wherein the body is composed of plastic in its majority.

35. The wireless game piece in accordance with Claim 30, wherein the body is composed of wood in its majority.

36. The wireless game piece in accordance with Claim 30, wherein the body is composed of metal in its majority.

37. The wireless game piece in accordance with Claim 30, wherein the electronic power source is a rechargeable battery, the wireless game piece further comprising:

   a plurality of electrical contacts accessible from outside of the body, each establishing an electrical path from the outside of the body to the rechargeable battery.

38. The wireless game piece in accordance with Claim 30, wherein the electronic power source is a non-rechargable battery.

39. The wireless game piece in accordance with Claim 30, wherein the electronic power source is an insertable and removable battery.

40. The wireless game piece in accordance with Claim 30, wherein the electronic power source is integrated within the wireless game piece so as to not be non-removable.

41. The wireless game piece in accordance with Claim 30, the wireless game piece further comprising:

   a status indicator visible from external to the body.

42. The wireless game piece in accordance with Claim 30, wherein the body is translucent.
43. The wireless game piece in accordance with Claim 30, wherein the body is opaque.

44. The wireless game piece in accordance with Claim 30, further comprising:
   a counterweight positioned rigidly within the multi-sided body so as to further center a center of gravity of the wireless game piece.

45. A wireless game piece recharger comprising:
   a recharger body having a recharger receptacle sized to receive a body of a wireless game piece having an embedded rechargeable battery;
   a plurality of electrical contacts in the recharger receptacle; and
   a power source configured to provide recharging electrical power through at least some of the plurality of electrical contacts and to the rechargeable battery when the wireless game piece is inserted into the receptacle in a specific orientation.

46. The wireless game piece recharger in accordance with Claim 45, wherein the recharger receptacle is sized to receive a wireless die.

47. The wireless die recharger in accordance with Claim 46, wherein the recharger receptacle is sized to receive a six-sided cube die.

48. The wireless game piece recharger in accordance with Claim 45, wherein the recharger body has a plurality of recharger receptacles, each sized to receive a corresponding rechargeable game piece, and each containing a plurality of electrical contacts for recharging the corresponding rechargeable game piece.

49. The wireless game piece recharger in accordance with Claim 45, further comprising:
   a cover that is configured to close onto the recharger body so as to create a cavity defined by the cover and by the recharger receptacle that fits the wireless game piece.
**FIG. 5**

Player Console 500
Private Display Area 501
Game Logic 502
Game State 503
Input Mechanism 504
Transceiver 505

**FIG. 6**

600
602
601

603A
603B
603C
FIG. 8
INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/028352

A  CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A63F 13/00 (2010 01)
USPC - 463/37

According to International Patent Classification (IPC) or to both national classification and IPC

B  FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - A63F 13/00; A63F 9/22 (2010 01)
USPC - 463/30, 37, 39, 9

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
MicroPatent

C  DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 2008/0318550 A1 (DEATLEY) 25 December 2008 (25 12 2008) entire document</td>
<td>1, 2, 4-16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3, 30-44</td>
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<tr>
<td>Y</td>
<td>US 7,095,033 A (SORGE) 22 August 2006 (22 08 2006) entire document</td>
<td>3 and 31</td>
</tr>
<tr>
<td>A</td>
<td>US 2006/0073869 A1 (LEMAY et al) 06 April 2006 (06 04 2006) entire document</td>
<td>1-16 and 30-44</td>
</tr>
<tr>
<td>A</td>
<td>US 2006/0052885 A1 (KONG) 09 March 2006 (09 03 2006) entire document</td>
<td>1-16 and 30-44</td>
</tr>
</tbody>
</table>

D

Further documents are listed in the continuation of Box C

Date of the actual completion of the international search
15 July 2010

Date of mailing of the international search report
04 AUG 2010

Name and mailing address of the ISA/US
Mail Stop PCT, Attn ISA-US, Commissioner for Patents
P O Box 1450, Alexandria, Virginia 22313-1450

Authorized officer
Blame R Copenhagen

PCT Helpdesk 571-272-4300
PCT/OS 571-272-2774

Form PCT/ISA/210 (second sheet) (July 2009)
INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/028352

Box No. I I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons

1. Claims Nos
   because they relate to subject matter not required to be searched by this Authority, namely
   
2. Claims Nos
   because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically
   
3. Claims Nos
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. Ill Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows

See extra sheet

1. D As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims

2. I I As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees

3. I I As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims, it is covered by claims Nos 1-16, 30-44

Remark on Protest

D The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee

D The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation

No protest accompanied the payment of additional search fees

Form PCT/ISA/210 (continuation of first sheet (2)) (July 2009)
Continuation of Box III

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13 1 in order for all inventions to be examined, the appropriate additional examination fees must be paid

Group I, claims 1-16, 30-44, drawn to a game input device having an orientation sensor, a transmission mechanism which transmits a spatial orientation signal to a flat multi-touch functional display, a reception mechanism which receives the spatial orientation signal, and a game incorporation mechanism which alters a game state based on the spatial orientation information

Group II, claims 17-29, drawn to a player console for multiple players, comprising a private display area and game logic capable of rendering at least a portion of a private portion of game state for at least one player on a private display area, and further comprising an input area capable of responding to a physical input of the at least one player, a transmission device to transmit the input to a flat multi-touch functional display, a reception mechanism to receive the input information, and a game incorporation mechanism which alters a game state based on the input information

Group III, claims 45-49, drawn to a wireless game piece recharger

The inventions listed as Groups I, II and III do not relate to a single general inventive concept under PCT Rule 13 1 because, under PCT Rule 13 2, they lack the same or corresponding special technical features for the following reasons the special technical feature of the Group I invention an orientation sensor and altering the game state based on the spatial orientation signal as claimed therein is not present in the invention of Groups II and III. The special technical feature of the Group II invention a player console having a private display area to display a game state associated with a player, and altering the game state based on the player input information as claimed therein is not present in the invention of Groups I or III. The special technical feature of the Group III invention the game piece recharger as claimed therein is not present in the invention of Groups I or II.

Groups I and II lack unity of invention because even though the inventions of these groups require the technical feature of a distributed electronic game system having a game input device, a flat touch-screen display, a transmission mechanism to transmit control signals, a reception mechanism at the display to receive the control signals, and an incorporation mechanism to alter a game state based on control signals, this technical feature is not a special technical feature as it does not make a contribution over the prior art in view of U.S. 2006/0073869 A1 (LEMAY et al) 06 April 2006 (06 04 2006) figure 9, paragraphs [0050], [0061], [0075], [0079], [01 11]

Groups I and II lack unity of invention because even though the inventions of these groups require the technical feature of a flat multi-touch functional display, this technical feature is not a special technical feature as it does not make a contribution over the prior art in view of U.S. 2006/0052885 A1 (KONG) 09 March 2006 (09 03 2006) paragraph [0102]

Since none of the special technical features of the Group I, II or III inventions are found in more than one of the inventions, unity of invention is lacking