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(54) MOBILE ELECTRONIC VIDEO GAME

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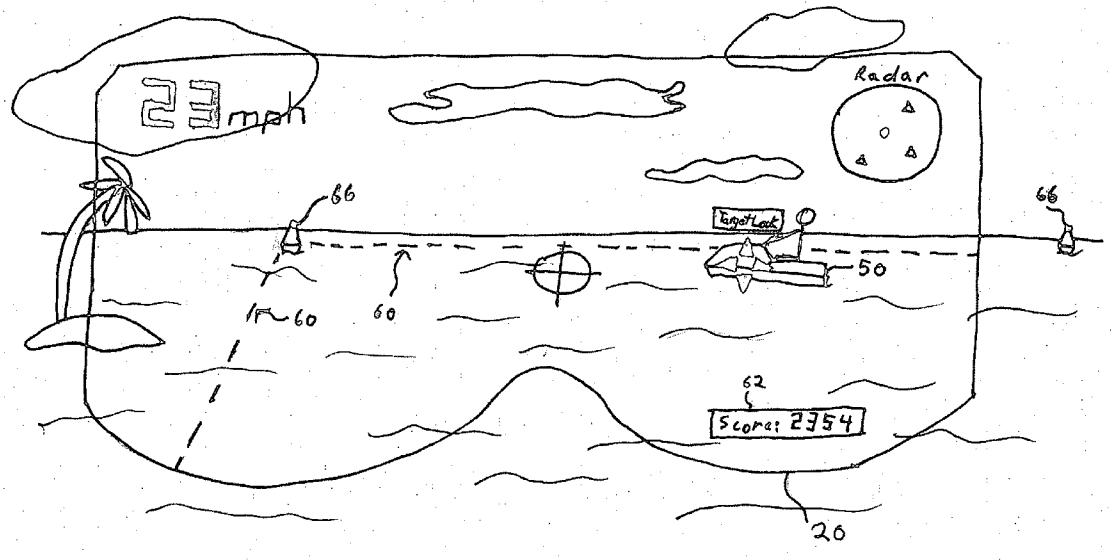
(52) **U.S. Cl.** **463/42**; 463/36

(57) **ABSTRACT**

A video gaming device includes a central gaming unit in communication with a heads-up display and a location sensing sensor. The location sensor is preferably in the form of a global positioning system satellite receiver, and senses the video gaming device's geographic location. Ideally, the video gaming device is used in conjunction with a vehicle, such as a recreational vehicle in the form of a snowmobile, all terrain vehicle or personal watercraft. Game play is controlled by interaction with the vehicle, thus combining the enjoyment derived from operation of the vehicle with enjoyment derived from the game. Optionally, a plurality of sensors and interfaces sense the operating condition of the vehicle, and reaction of the user. Various games may be loaded into the device from a computer readable medium storing gaming software.



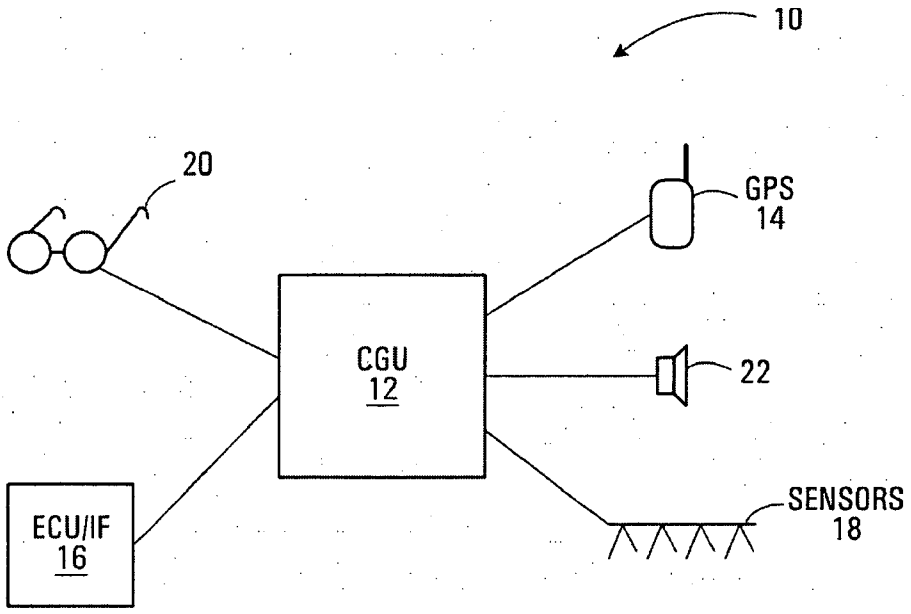

10
20
GPS
14
CGU
12
22
ECU/IF
16
SENSORS
18

FIG. 1

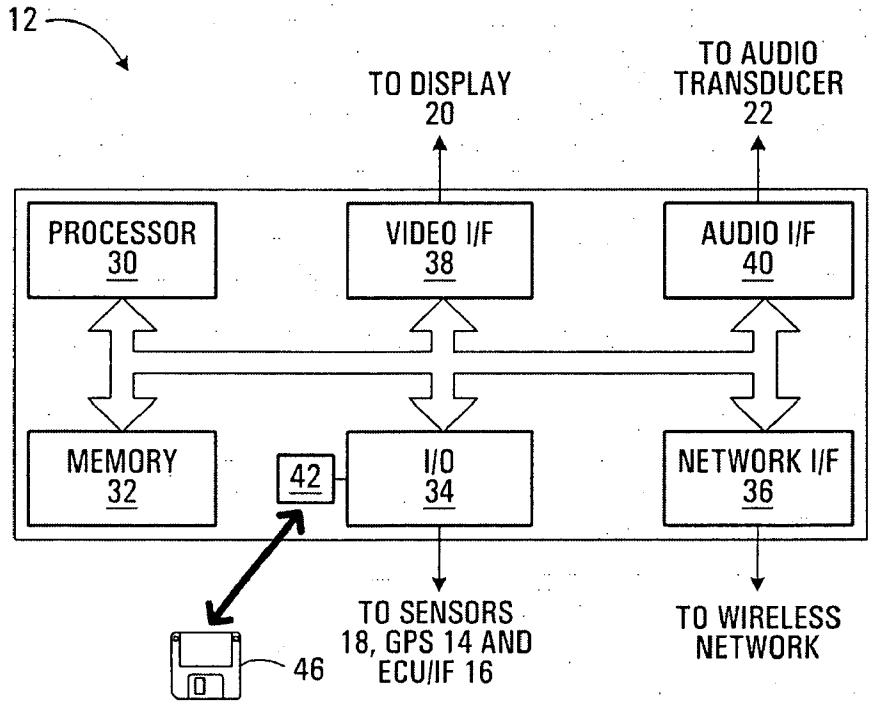

12
TO DISPLAY
20
TO AUDIO
TRANSDUCER
22
PROCESSOR
30
VIDEO I/F
38
AUDIO I/F
40
MEMORY
32
42
I/O
34
NETWORK I/F
36
46
TO SENSORS
18, GPS 14 AND
ECU/IF 16
TO WIRELESS
NETWORK

FIG. 2

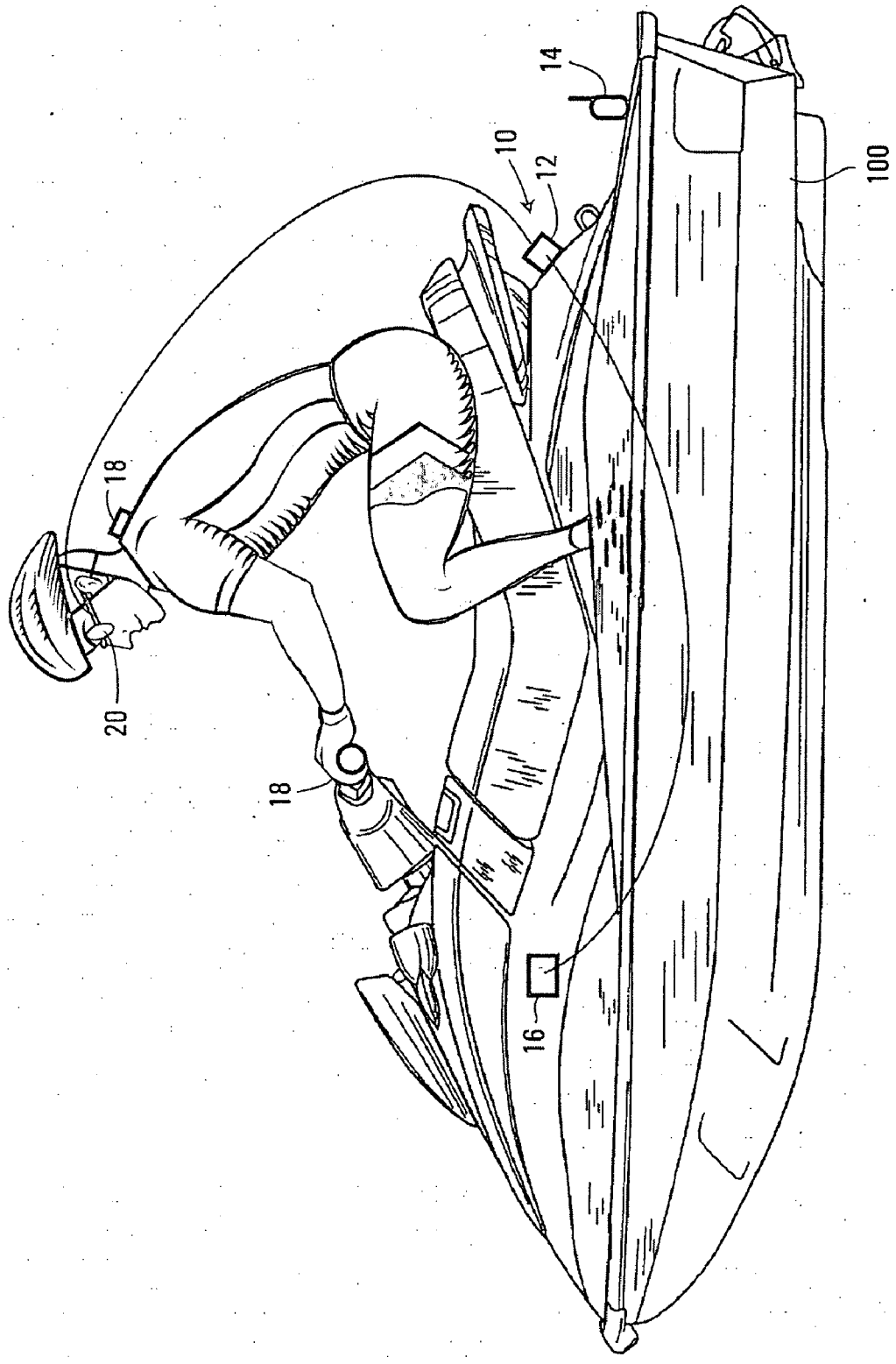


FIG. 3

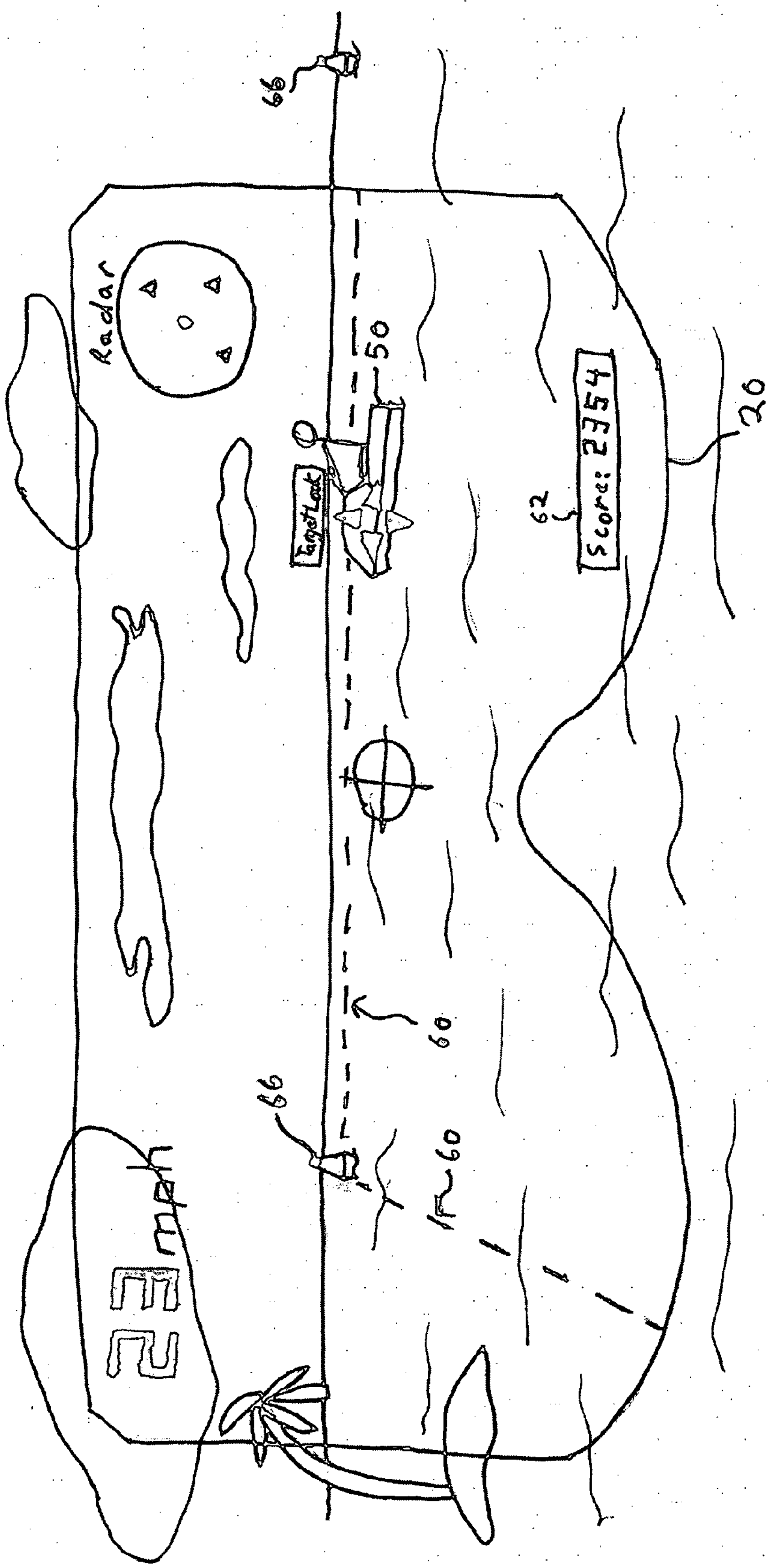


Fig. 4

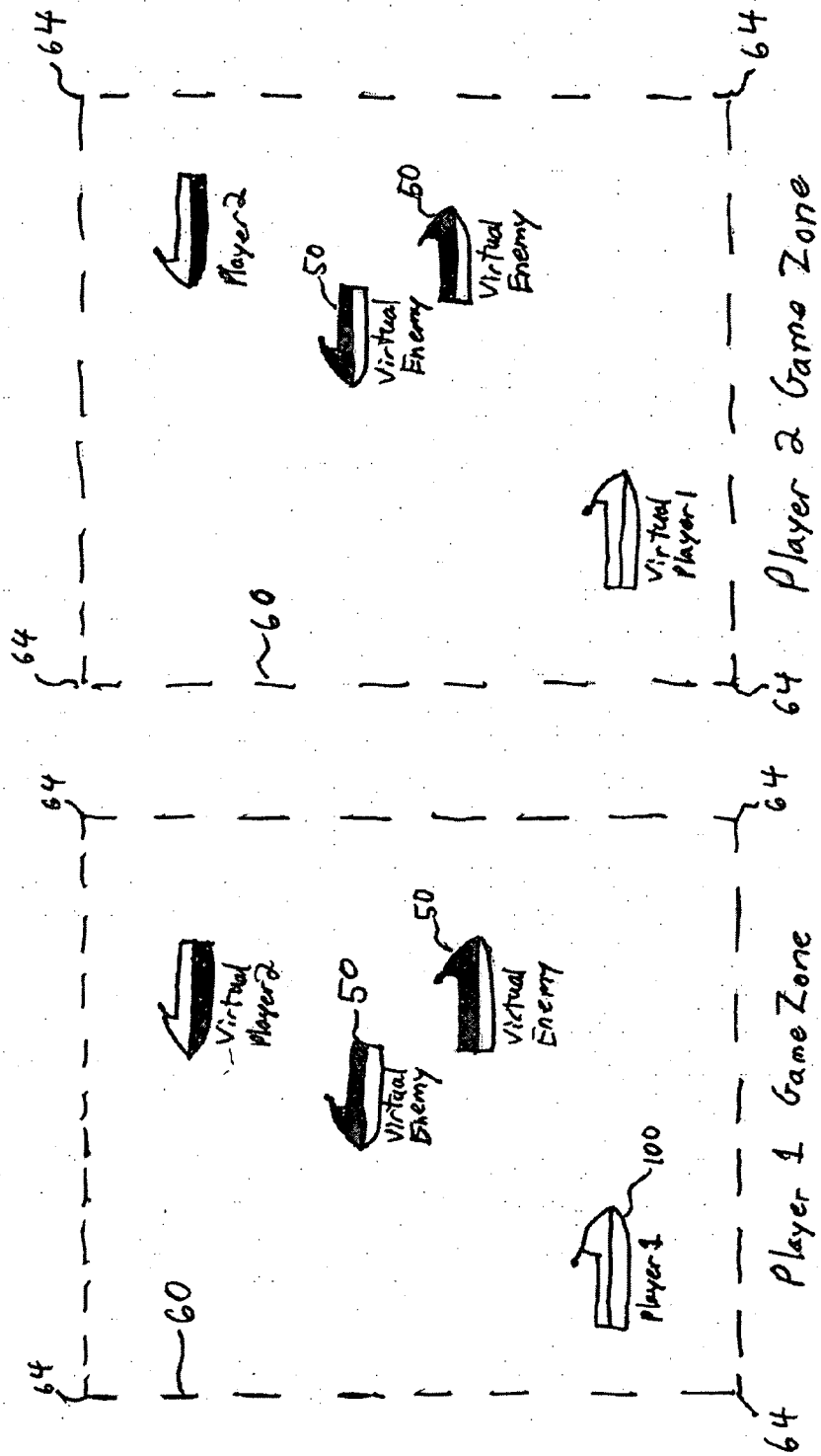

64
64
64
64
64
64
64
64
60
60
Player 1 Game Zone
Player 2 Game Zone
Virtual Player2
Virtual Enemy
Virtual Enemy
Virtual Enemy
Virtual Enemy
Player1
Virtual Player1
Player2
50
50
50
50
100

Fig. 5

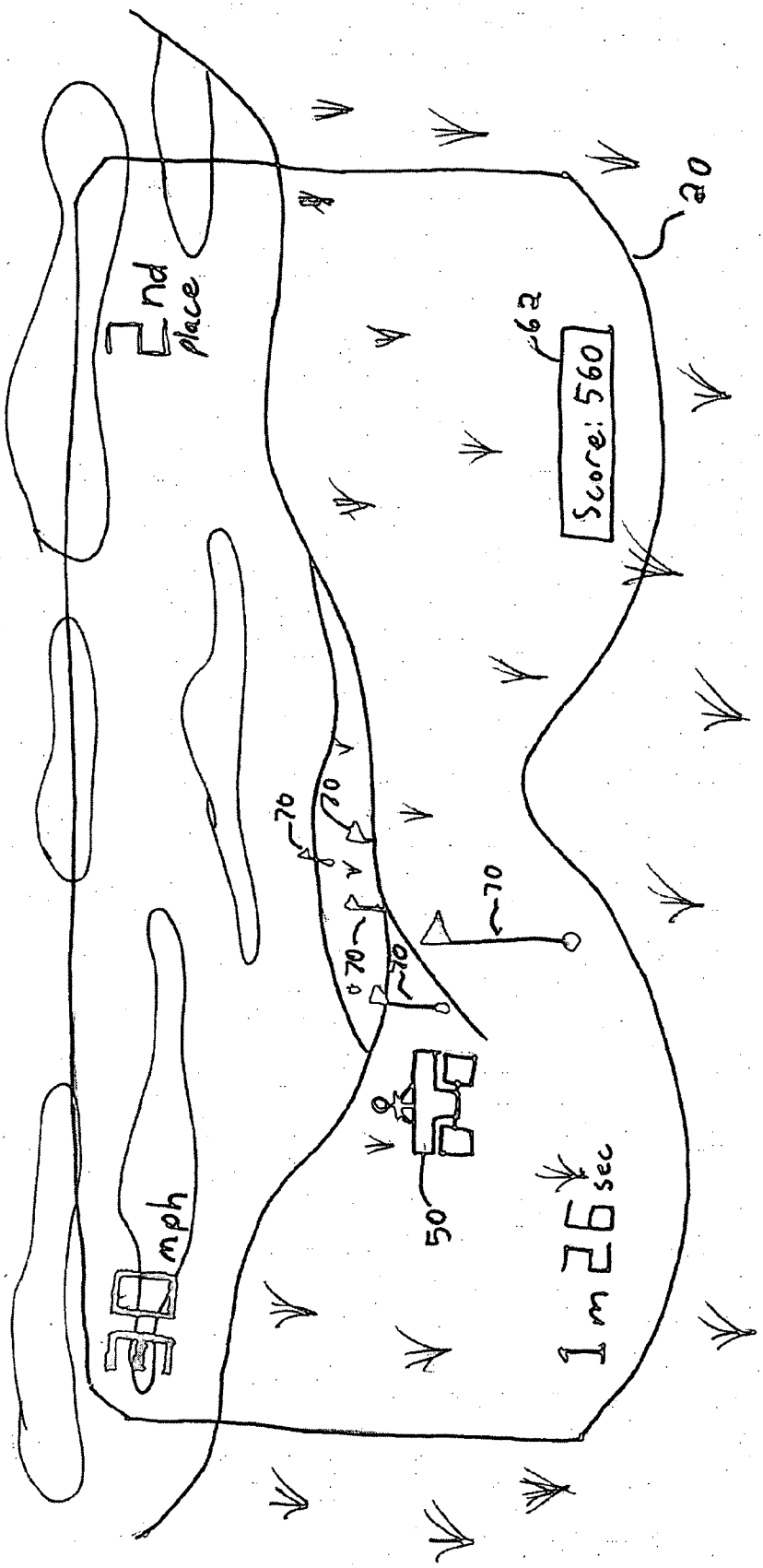
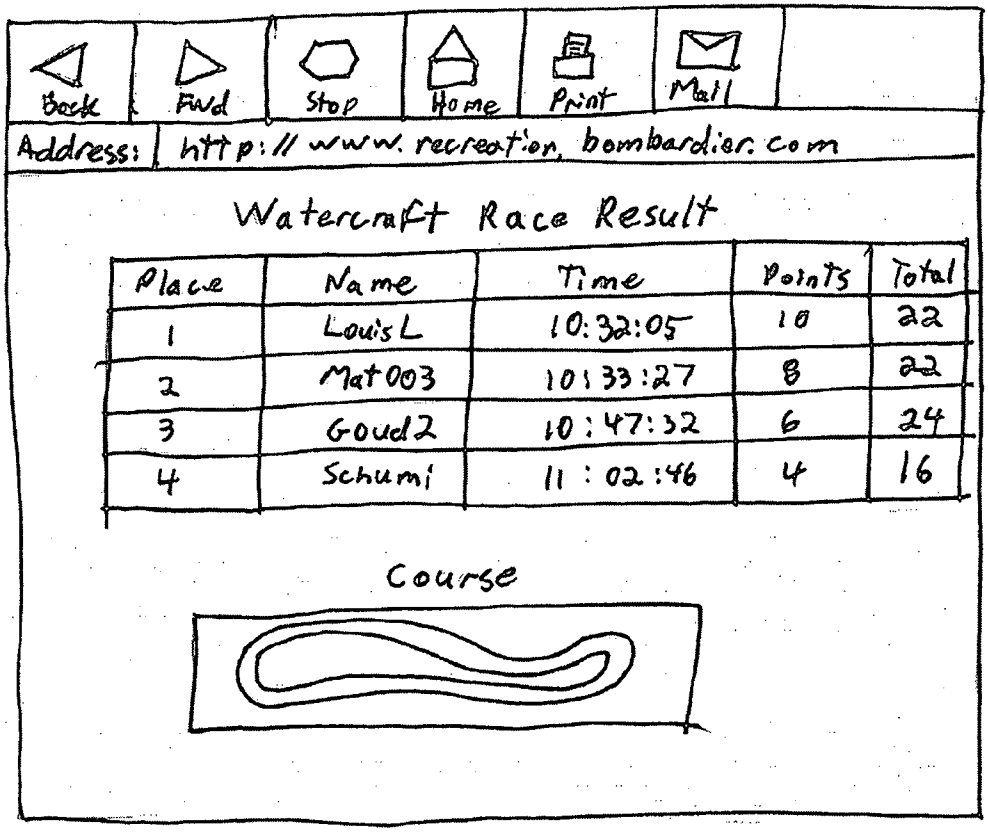


Fig. 6



Place	Name	Time	Points	Total
1	LouisL	10:32:05	10	22
2	Mat003	10:33:27	8	22
3	Goud2	10:47:32	6	24
4	Schumi	11:02:46	4	16

Fig. 7

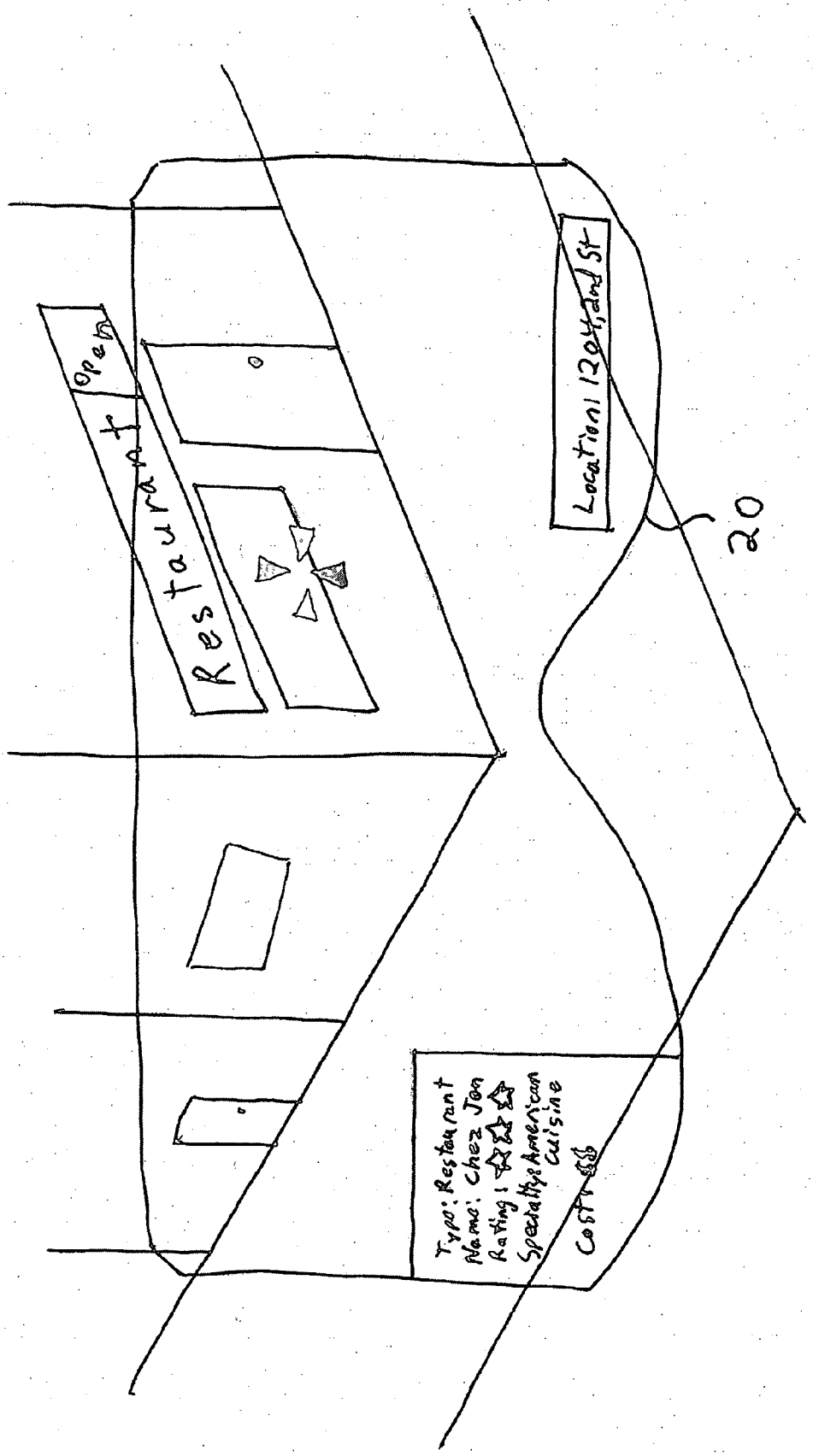

Open
Restaurant
Location: 120th and St
20
Type: Restaurant
Name: Chez Jon
Rating:
Specialty: American cuisine
Cost:

Fig. 8

MOBILE ELECTRONIC VIDEO GAME

[0001] The present application claims priority to U.S. Provisional Application of Levesque, Serial No. 60/430,682, filed Dec. 4, 2002, the entirety of which is hereby incorporated into the present application by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to video games, and more particularly to mobile electronic video games.

BACKGROUND OF THE INVENTION

[0003] Since their advent in the 1970s, electronic video games have captured the imaginations of millions. Although these games were initially limited to crude graphics displayed on cathode ray tubes, the continuous improvement in computing and display technology has allowed for the never-ending improvement of video and the video gaming experience.

[0004] In the last decade virtual reality games have been developed. These games allow players to experience simulated realities. They display game images in three dimensions, and allow player interaction with the presented reality using a variety of sensors. For the most part, these games simulate only limited game scenarios. None have yet simulated an entire virtual world. Interestingly, none of these games has gained widespread commercial success.

[0005] In part, the lack of commercial success of existing virtual reality games may be attributable to the current state of technology and the quality of the games. However, it is also attributable to the relatively small consumer market; the appeal of these games is limited to devoted video gamers.

[0006] Some games have attempted to incorporate additional activities with the video gaming experience. For example, some video games attempt to incorporate sports and exercise with the video gaming experience. One such game allows a stationary bicycle rider to be part of a simulated race. These games, however, have served more as a motivational tool than as a form of entertainment. Further, the sports and exercise activity is often constrained to accommodate use of the video game.

[0007] Accordingly, there is a need for an improved video game that interacts with other forms of amusement, preferably presenting some form of simulated reality.

SUMMARY OF THE INVENTION

[0008] In accordance with an aspect of the present invention, a video gaming device includes a central gaming unit in communication with a heads-up display and a location sensing sensor. The location sensor is preferably in the form of a global positioning system satellite receiver, and senses the video gaming device's geographic location. Ideally, the video gaming device is used in conjunction with a vehicle, such as a recreational vehicle in the form of a snowmobile, all terrain vehicle or personal watercraft. Game play is controlled by interaction with the vehicle, thus combining the enjoyment derived from operation of the vehicle with enjoyment derived from the game. Optionally, a plurality of sensors and interfaces sense the operating condition of the vehicle, and reaction of the user.

[0009] In accordance with another aspect of the present invention, an electronic video gaming device, including: a processor in communication with processor readable memory; a video interface; a heads-up display; a location sensor for sensing a geographic location of the device, the location sensor in communication with the processor to provide data indicative of the geographic location to the processor; and a vehicle engine interface, for interconnection to an engine of a vehicle to sense a plurality of operating parameters of the engine. The memory stores gaming software, to present a video game on the heads-up display, wherein play of the video game is controlled by the data from the location sensor.

[0010] In accordance with a further aspect of the present invention, a computer readable medium, storing gaming software loadable at a gaming device, the gaming device including a processor in communication with processor readable memory; a video interface, in communication with a heads-up display; and a location sensor for sensing a geographic location of the gaming device, in communication with the processor. The gaming software adapts the gaming device to present a video game whose play is controlled by location of the gaming device, as sensed by the location sensor.

[0011] In accordance with yet a further aspect of the present invention, a method of operating an electronic video gaming device in a moving vehicle, the method including: presenting a video game on a heads-up display; sensing a geographic location of the video gaming device; controlling play of the video game based on the sensed geographic location.

[0012] Other aspects and features of the present invention will become apparent to those of ordinary skill in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] In the figures which illustrate by way of example only, embodiments of this invention:

[0014] **FIG. 1** is a simplified block diagram of a video gaming device exemplary of an embodiment of the present invention;

[0015] **FIG. 2** is a block diagram of a central gaming unit of the device of **FIG. 1**;

[0016] **FIG. 3** is a perspective view of a recreational vehicle including a video gaming device exemplary of an embodiment of the present invention; and

[0017] FIGS. **4-8** are screens captures illustrating exemplary video game play using the device of **FIG. 1**.

DETAILED DESCRIPTION

[0018] **FIG. 1** illustrates a mobile electronic video gaming device **10** exemplary of an embodiment of the present invention. As illustrated, exemplary mobile gaming device **10** includes a central electronic gaming unit **12** interconnected with a location sensor **14**; a vehicle electronic control unit interface (ECU/IF) **16**; a plurality of sensors **18**; a heads-up display **20**; and an audio output transducer **22**.

[0019] A preferred simplified example architecture for central gaming unit **12** is illustrated in **FIG. 2**. As illustrated, gaming unit **12** has an architecture very similar to that of a conventional computing device. As such, gaming unit **12** includes a central processor **30** in communication with memory **32**, a video interface **38**, an audio interface **40**, an input/output interface **34** and optionally a network interface **36**. Gaming device **10** further includes a memory reader **42**. Memory reader **42** may be a CD-ROM, DVD, diskette or similar drive, ROM slot, or the like for loading gaming software for processing by device **10** from a computer readable medium **46**. Computer readable medium **46**, in turn may be an optical storage memory such as a CD-ROM, DVD or the like; magnetic memory in the form of a diskette or the like; or a solid state memory such as a ROM cartridge.

[0020] Processor **30** may be any suitable processor capable of processing processor executable instruction of sufficient complexity and at sufficient speed to present a near real-time gaming environment to an end-user. Processor **30** may for example be a conventional x86 processor, a RISC processor, or any other processor known to those of ordinary skill. Memory **32** may be any combination of computer readable memory and may include persistent storage memory in the form of a hard disk drive, random access memory, static memory, and the like. Video interface **38** preferably includes a video processor capable of displaying three-dimensional graphics at suitable resolutions and speeds to present a game-playing environment, or to represent images that may be superimposed on a background representing a real-world environment. Video interface **38** preferably includes a port for connection to a suitable heads-up display **20** (**FIG. 1**).

[0021] Audio interface **40** receives audio data from processor **30** or memory **32** and produces corresponding analog audio effects in the form of music, sound effects and the like on audio transducer **22** (**FIG. 1**).

[0022] Optionally, central gaming unit **12** includes a network interface **36** for interconnection with a wireless communications network. Network interface **36** for example may allow gaming unit to communicate by way of a wireless GPRS, CDMA or other network. As will become apparent, network interface **36** may allow communication of gaming unit **12** with a server or other similar proximate central gaming units, either by way of data or voice.

[0023] Input/output interface **34** preferably includes suitable ports for connection of sensors **18**, location sensor **14**, and ECU interface **16**. Input/output interface **34** may for example be a high-speed parallel or serial port and may for example include one or more optical, electrical or wireless ports.

[0024] Heads-up display **20** is preferably a video display device that allows an operator to view an image without diverting his or her eyes from their normal point of focus. Preferably, computer generated images displayed by way of display **20** are overlayed on a user's view of the real world. Heads-up display **20** for example may include an automobile or other vehicle windshield and associated projector for projecting an image thereon. Heads-up display **20** may alternatively take the form of monocular or binocular viewers that may, for example, be in the form of integrated eye glasses, again allowing the user to view an electronically presented image without unduly obstructing the user's view. As another further alternative, heads-up display **20** may form part of a helmet visor. Optionally, multiple independent heads-up displays could be connected to video interface **38**. In this way, two or more users could jointly participate in game play using device **10**. Existing heads-up displays suitable for use as heads-up display **20** are well known in the art. For example MicroOptical Corporation manufactures a suitable heads-up display, available in association with the trademark Video Viewer. The development of a multitude of other heads-up displays suitable for use as part of gaming device **10**, are anticipated.

[0025] Location sensor **14** is preferably a conventional global positioning system (GPS) satellite receiver that provides an indication of sensed geographic location to gaming unit **12** via suitable port that may for example form part of input/output interface **34**. Typically data indicative of sensed latitude, longitude, and optionally altitude (or elevation) is provided to central gaming unit **12**. Changes in sensed location over time may be used to assess velocity of gaming unit **12**. GPS receivers as so described are also readily available and understood. For example, Motorola's Instant GPS, SiGe Semiconductor's SE1400 GPS IC or RF Micro Devices' RF8000 could be used in suitable GPS receivers.

[0026] External sensors **18** include a plurality of sensors suitable for sensing external physical operating parameters. Sensors **18** may, for example, include a plurality of tracking sensors worn by a user, providing indicators of movements of certain of the user's body parts. Example sensors **18** could include glove based sensors; exoskeleton devices; electromechanical sensors (e.g. microelectromechanical system (MEMS) sensors); optical sensors; retinal sensors; acoustical sensors; or the like. In a preferred embodiment, example sensors **18** include a sensor indicative of the position or movement of a user's limbs relative to his or her body, and sensors to sense the position (e.g. tilt and rotation) of the user's head relative to the user's torso. Sensors **18** further preferably include one or more button or trigger sensors, connected to suitable buttons/triggers allowing a user to provide deliberate control inputs. Suitable electromechanical sensors may be installed in gear, such as a helmet, face mask, suit or gloves worn by the user or on ancillary equipment used in association with gaming device **10**. Sensors can additionally sense water conditions (e.g. chop); weather conditions (temperature, humidity, etc.); vehicle state including steering position, throttle position and transmission position. Countless other sensors could be included as required. These tracking sensors provide a suitable electronic sensing signal, in analog or digital form, to central gaming unit **12** by way of, for example, input/output interface **34**. Ultimately, numerical values indicative of the sensors states may be used by central gaming unit **12**. As will become apparent, these numerical values are used to control game play.

[0027] ECU interface **16** allows determination of the operating parameters of a vehicle by sensing engine-operating conditions and providing these to central gaming unit **12**. ECU interface **16** includes suitable electronics for connecting gaming unit **12** to the electronic control unit of an associated vehicle engine. As such, interface **16** allows both the sensing and control of vehicle engine parameters such as throttle, operating speed, and engine temperature. ECU interface **16** preferably includes one or more output ports to provide controlled outputs to limit one or more of these

operating parameters including for example, engine speed and throttle and kill (i.e. shut off) the engine.

[0028] Central gaming unit **12** is further preloaded with video game software read from computer readable medium **46**, exemplary of embodiments of the present invention. Persons of ordinary skill will readily appreciate that the creation of video game software is well understood. For example, game development kits on a variety of platforms exist. For reasons that will become apparent, virtual reality modeling software, might be used to form suitable gaming software. Alternatively, such gaming software may be written on a general-purpose central gaming unit **12** using techniques understood by those of ordinary skill. Unlike conventional gaming software however, gaming software exemplary of the embodiments of the present invention processes inputs taken from one or more of location sensor **14**, external sensors **18** and ECU interface **16**, as described below.

[0029] Audio output transducer **22** generates audible sounds in response to electronic signals provided to it. Audio transducer **22** may be a speaker, piezoelectric element, earphone, or the like. Audio transducer **22** generates sounds in the form of music from signals provided by audio interface **40**.

[0030] In operation, mobile video gaming device **10** is preferably fitted on a vehicle. Preferably mobile video gaming device **10** is fitted on a recreational vehicle such as a snowmobile, all-terrain vehicle or personal watercraft. Example vehicles include a Bombardier® Ski-Doo® Rev™ snowmobile; a Bombardier™ DS650™ all-terrain vehicle; or a Bombardier® Sea-Doo® XP® personal watercraft. **FIG. 3** accordingly illustrates a vehicle **100** in the form of a personal watercraft equipped with a game device **10**, of the type depicted in **FIGS. 1 and 2**. A user/operator and several sensors **18** are also illustrated.

[0031] Display **20** is configured so that a user/operator and/or passenger of the vehicle is presented with a heads-up display allowing the operator or passenger to view the path of the vehicle while viewing an image presented by mobile gaming device **10**.

[0032] After initial configuration a game user is presented with a conventional startup/option screen for a video game. Inputs controlling play of the video game, however, are provided at least in part by actual operation of the vehicle through sensors **18**, location sensor **14**, and ECU interface **16**.

[0033] In this way gaming device **10** may be aware of the current location and speed of the associated vehicle **100** as provided by location sensor **14**; certain physical parameters provided by sensors **18**; and the operating condition of the vehicle's engine as provided by ECU interface **16**. With these inputs, any variety of games may be defined.

[0034] FIGS. **4** to **8** therefore illustrate example games that may be presented by gaming device **10** to an operator. As illustrated in **FIG. 4, a** first example game may present simulated opponents **50** within a virtual boundary **60**. Images of craft(s) representing the opponents **50** are presented to the user on display **20**. Inputs received by way of external sensors **18** and location sensor **14** allows gaming device **10** to simulate interaction with these virtual opponents **50**. For example, as the opponents **50** are approached, their size may be magnified on display **20**, much in the same way a user would view actual opponents. Any motion of the user's head, as sensed by one of external sensors **18** may be taken into account. To enhance game play, movement of the enemies in three-dimensional space, within defined boundaries may be simulated. The position and speed of the vehicle **100** may be taken into account when presenting the simulated images on display **20**. Sensor inputs may allow the deployment of simulated weapons to destroy the virtual opponents **50**. Scores **62** may be accumulated and tracked by gaming unit **12** as each opponent **50** is destroyed. Optionally, weapon fire from opponents **50** may be simulated on display **20**. Actual motion of the vehicle to avoid launched weapons may also be accounted for. Inputs received from location sensor **14** may be used to assess the vehicle's relative position to any virtual opponents **50** as well as vehicle speed and the like.

[0035] Further, as illustrated in **FIG. 5 a** virtual boundary **60** may be enforced by gaming device **10**, to ensure safe game play. The virtual boundary **60** may initially be defined by way of a configuration screen similar to that illustrated in **FIG. 5**. The configuration screen may allow a user to travel to the corners **64** of the boundary using vehicle **100** and providing an input by way of one of sensors **18**, for example in the form of a button on the player's uniform or on vehicle **100**. The location of the boundary **60** may be stored within memory **32** for later use. Preferably the boundary region is rectangular in nature, thereby requiring only inputs of opposed corners **64**. Once the boundary **60** is defined and stored at central gaming unit **12**, gaming unit **12** may react to an operator crossing the defined virtual boundary **60** (as sensed through location sensor **14**) with the vehicle by disabling or slowing the vehicle's engine through ECU interface **16** or alternatively sending a necessary warning to the operator by way of display **20** to shut down the vehicle and/or disable the game, thereby maintaining a level of safety.

[0036] Similarly, gaming device **10** may monitor the overall speed of the vehicle (by way of location sensor **14**), send warnings by way of display **20** and audio transducer **22** and slow the vehicle through ECU interface **16** in the event that speed thresholds are exceeded. Again speed thresholds could be set by a gaming unit operator and could, for example, be password protected or through a key, such as the Sea-Doo® Learning Key™, available for certain Bombardier Recreational Products recreational vehicles.

[0037] Optionally, multiple vehicles each equipped with gaming device **10** could be allowed to play within one set of virtual boundaries **60**. As a further alternative, information about multiple players each playing within his/her own non-overlapping virtual boundaries **60** may be assimilated. Information about the players may be shared between multiple gaming devices **10** (as for example by way of network interface **36**) and each gaming device **10** may superimpose the multiple game zones, and present images representing players outside a current player's zone in that player's heads up display. In this way, the multiple players may play against each other without occupying the same physical space. Again, to facilitate play between multiple players, voice data may be exchanged between players by way of network interface **36**, or otherwise.

[0038] As a further option, visible buoys **66** (see **FIG. 4**) delineating the virtual boundaries **60** may be placed at the

corners **64** of the virtual boundaries **60**. The buoys **66** may be simple floating buoys. Optionally, they may be equipped with one or more transmitters to dispatch a signal for receipt by gaming devices **10** (again, possibly by way of network interface **36**) within a delineated virtual boundary **60**. Multiple buoys **66** may be physically connected to each other, by way of a rope or string, or the like. Breach (i.e. trespass into, or escape from) of a virtual boundary **60***n* could be detected as a result of disconnection of the rope or string. This breech could be signalled to gaming devices **10** to again slow or stop the vehicles. Advantageously, breach of the virtual boundary **60** by persons other than game participants may thus be detected.

[**0039**] A further alternative game is illustrated with reference to **FIG. 6**. As illustrated, a virtual obstacle course in three dimensions may be presented on display **20** as illustrated in **FIG. 6**. An operator of the vehicle may steer the vehicle to avoid collision with the presented obstacles **70**. Again, gaming device **10** simulates the obstacles **70** on display **20** and assess the location and operating speed of the vehicle relative to the simulated obstacles **70** thereby allowing the simulation of interaction of the player with the course. Conveniently, scores **62** of multiple players (each playing within a separately defined and enforced boundary) may be maintained by gaming device **10** or alternatively communicated wirelessly by way of network interface **34** (**FIG. 2**) to other gaming units or to a centralized network site. An example score board is illustrated in **FIG. 7**.

[**0040**] As should now be appreciated, use of sensors **14**, **18** and ECU interface **16** allows for a wide variety of simulated games for use with a vehicle. The game may, for example, be simulated with reference to a map based on known geography of an area. Data representative of maps in known usage areas may be stored on computer readable medium **46** or otherwise in memory **32**. Map information may be correlated to measured location as sensed by location sensor **14**. Obstacles **70** in the form of islands, houses, and the like may be presented on heads-up display **20** with reference to knowledge of the existing topography. Similarly treasures, enemies **50**, targets, other players and the like may be simulated (and thus for example, hidden or blended) with the existing natural backdrop seen through heads-up display **20**, with reference to the existing topography.

[**0041**] In a further embodiment, gaming device **10** may use information about the geography to present targets and obstacles as a realistic backdrop to the remaining scenery. This may for example be useful in an automobile. Gaming device **10** may present an image such as a target, deer, an opponent, etc. apparent on the side of the road. Capture, stunning or killing of the target may be assessed using telemetry sensors or other interfaces. Again, an optional one of sensors **18** may take the form of a simulated pistol, rifle or the like.

[**0042**] As a further option, gaming device **10** may serve as a virtual guide, providing heads-up information about scenic areas, buildings and the like as illustrated in **FIG. 8**. Again, data about scenery, visual through heads-up display **20** may be obtained using knowledge of the gaming device's location (as determined by location sensor **14**) as well as the user's line of sight (as determined through sensors **18**). Historical facts, trivia, advertisements, and the like could be presented based on the knowledge of location and line of sight. Computer readable media (such as medium **46**) may be made available for multiple possible areas of interest. As required, additional data could be obtained by device **10** over a data network by way of network interface **36** (**FIG. 2**).

[**0043**] From the forgoing it should be readily appreciated that nearly an infinite variety of gaming software taking advantage of one or more of display **20**, location sensor **14** and sensors **18** may be possible. Each game may be loaded from a computer readable medium, like medium **46**. New games may be periodically provided. As required, additional sensors may be added to device **10**. Advantageously, enjoyment provided by vehicle **100** may be combined with the provided video games for an enhanced use and enjoyment.

[**0044**] Of course, the above-described embodiments are intended to be illustrative only and in no way limiting. The described embodiments of carrying out the invention are susceptible to many modifications of form, arrangement of parts, details and order of operation. The invention, rather, is intended to encompass all such modification within its scope, as defined by the claims.

What is claimed is:

1. An electronic video gaming device, comprising:

a processor in communication with processor readable memory;

a video interface;

a heads-up display;

a location sensor for sensing a geographic location of said device, said location sensor in communication with said processor to provide data indicative of said geographic location to said processor;

said processor readable memory storing gaming software, to present a video game on said heads-up display, wherein play of said video game is at least partially controlled by said data from said location sensor.

2. The gaming device of claim 1, further comprising:

a plurality of sensors, in communication with said processor, each of said sensors for sensing an external input used to influence play of said video game.

3. The gaming device of claim 2, wherein at least one of said sensors is wearable and senses a position of a user's head.

4. The gaming device of claim 3, wherein said location sensor comprises a global positioning system ("GPS") satellite receiver.

5. The gaming device of claim 1, further comprising:

a vehicle engine interface for interconnecting a vehicle engine with said processor in order to provide data on at least one engine operating parameter to said processor.

6. The gaming device of claim 5, wherein said vehicle engine interface is further capable of providing said engine with data from said processor to control engine operation.

7. The gaming device of claim 6, wherein said engine will turn off in response to data received from said processor.

8. The gaming device of claim 6, wherein an operating speed of said engine is limited in response to data received from said processor.

9. The gaming device of claim 4, wherein said heads-up display forms part of a helmet.

10. The gaming device of claim 7, wherein said gaming software limits operation of an interconnected vehicle, when said device's position is outside a pre-defined boundary.

11. The gaming device of claim 10, wherein said software limits operation of an interconnected vehicle, when another vehicle breaches said pre-defined boundary.

12. The gaming device of claim 1, wherein said video game presents an obstacle course to be navigated by moving said gaming device.

13. The gaming device of claim 2, wherein said sensors sense at least one of water conditions, weather conditions, vehicle steering position, vehicle throttle position and vehicle transmission position.

14. A recreational vehicle comprising an electronic video gaming device as claimed in claim 1.

15. The gaming device of claim 1, wherein said heads-up display overlays computer generated images on a surrounding environment.

16. Computer readable medium, storing gaming software loadable at a gaming device, said gaming device comprising a processor in communication with processor readable memory; a video interface, in communication with a heads-up display; and a location sensor for sensing a geographic location of said gaming device, in communication with said processor; said gaming software adapting said gaming device to present a video game on said heads-up display whose play is at least partially controlled by location of said gaming device, as sensed by said location sensor.

17. A method of operating an electronic video gaming device in a moving vehicle, said method comprising:

presenting a video game on a heads-up display;

sensing a geographic location of said video gaming device;

at least partially controlling play of said video game based on said sensed geographic location.

18. The method of claim 17, further comprising:

limiting operation of an engine of said vehicle, when said sensed geographic location is outside a pre-defined boundary.

19. The method of claim 17, further comprising:

presenting elements of said video game according to topographical information.

20. The method of claim 17, further comprising:

clearing said heads-up display, when said said sensed geographic location is outside a predefined boundary.

21. The method of claim 17, further comprising:

defining a game zone; and

presenting at least one other vehicle on said heads-up display,

wherein a position within said game zone on said heads-up display of said other vehicle corresponds to an actual position of said other vehicle within another game zone.

22. The method of claim 17, further comprising:

controlling play of said video game based on at least one of vehicle steering position, vehicle throttle position, vehicle transmission position and user's head position.

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