VIRTUAL REALITY SIMULATION AND METHOD

CROSS REFERENCES TO RELATED APPLICATIONS

[0001] The following application claims priority under 35 U.S.C. § 119 (e) to U.S. Provisional Patent Application Serial No. 63/569,942 filed March 26, 2024 entitled *VIRTUAL REALITY SIMULATION AND METHOD*. Priority is claimed for the above-identified application, which is incorporated herein by reference in its entirety for all purposes.

TECHNICAL FIELD

[0002] The present disclosure generally relates to an apparatus and methods for virtual reality training, and more particularly to methods and devices utilizing a processor device, visual outputs, sensor devices and special sensors combination for use in facilitating virtual reality simulations including a pipette simulation and/or a gowning simulation.

BACKGROUND

[0003] Training for laboratory situations, such as using a micropipette, and/or properly gloving and gowning, is required for most workers in a laboratory and/or manufacturing environment. Real-world training can be time consuming, expensive (*e.g.*, product can be damaged from improper gowning or sterility), and/or risky if students make mistakes on real products and contaminated containers get sent to hospitals and/or are used on patients. Further, in the real-world, specific elements cannot be emphasized, or altered to better ingrain training. This is particularly the case for training that requires extensive laboratory training time for various certification or degreed programs. Such training is both expensive in capital equipment, as well

as requiring tear down, cleaning, and set-up costs.

SUMMARY

[0004] One aspect of the present disclosure comprises a non-transitory computer readable medium storing instructions executable by an associated processor to perform a method for implementing a gowning simulation. The method includes generating a three-dimensional initial view based upon a view selection input by a user, sending instructions to present the initial view to a user display of a headset, the user display comprised within the headset, and receiving an input from controllers comprising at least one sensor indicating user movement within the initial view. The method further accessing memory to present a glove pack and a gown sleeve pack, assigning a glove pack activation volume to the glove pack and assigning a gown sleeve pack activation volume to the gown sleeve pack, and responsive to detecting a first controller of the controllers within the gown sleeve pack activation volume, generating and presenting an image of the user wearing a first gown sleeve on a first arm. The method also including responsive to detecting a second controller of the controllers within the gown sleeve pack activation volume, generating and presenting an image of the user wearing a second gown sleeve on a second arm.

[0005] Another aspect of the present disclosure includes a virtual reality system for providing a gowning simulation. The system including a processing device having a processor configured to perform a predefined set of operations in response to receiving a corresponding input from at least one of virtual reality headset and first and second controllers, the processing device comprising memory, wherein a three-dimensional initial view of a gowning simulation is stored, the initial view comprising first and second hand icons, a glove pack and a sleeve pack, the first hand icon coupled to a first controller and the second hand icon coupled the second controller. The system further including wherein the processor instructs the initial view to be

presented on a user display comprised within the headset, at least one of the first and second controller sends an input to the processor indicating the controller is moving within the initial view, and the processor assigns a glove pack activation volume to the glove pack and assigns a gown sleeve pack activation volume to the gown sleeve pack. The system further including wherein responsive to the first controller sending inputs indicating that the first controller of is within the gown sleeve pack activation volume, the processor generates and presents an image of the user wearing a first gown sleeve on a first arm of the first hand icon, and responsive to the second controller sending inputs indicating that the second controller of is within the gown sleeve pack activation volume, the processor generates and presents an image of the user wearing a second gown sleeve on a second arm of the second hand icon.

[0006] Yet another aspect of the present disclosure includes a virtual reality system for providing a pipette simulation. The system includes a processing device having a processor configured to perform a predefined set of operations in response to receiving a corresponding input from at least one of virtual reality headset and first and second controllers, the processing device comprising memory, wherein a three-dimensional initial view of a pipette simulation is stored, the initial view comprising a pipette held by a first hand icon, a pipette aid coupled to the pipette, and a pipette sleeve held by a second hand icon. The system further includes wherein the processor instructs the initial view to be presented on a user display comprised within the headset, at least one of the first and second controller sends an input to the processor indicating the controller is moving within the initial view, and wherein the processor instructs the movement of the first controller, comprising the hand icon holding the pipette, and movement of the second controller, holding the pipette sleeve, to be presented on the user display. The method also includes wherein the processor assigns the pipette aid a pipette aid activation volume and the processor assigns the pipette sleeve a pipette sleeve activation volume, and

responsive to the first and second controllers sending inputs indicating that pipette aid activation volume is within the pipette sleeve activation volume for a threshold duration, the processor generates and displays the pipette aid as uncoupled from the pipette aid and uncoupled to movement of the first controller, and coupled to and residing within the pipette sleeve, and coupled to movement of the second controller.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The foregoing and other features and advantages of the present disclosure will become apparent to one skilled in the art to which the present disclosure relates upon consideration of the following description of the disclosure with reference to the accompanying drawings, wherein like reference numerals, unless otherwise described refer to like parts throughout the drawings and in which:

[0008] FIG. 1 illustrates an example virtual reality system, according to one example embodiment of the present disclosure;

[0009] FIG. 2 is a schematic diagram of a method of using an example virtual reality system, according to one example embodiment of the present disclosure;

[0010] FIG. 3A illustrates a gowning simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0011] FIG. 3B illustrates a gowning simulation utilizing a first gowning functionality generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0012] FIG. 3C illustrates a gowning simulation utilizing a first gowning functionality generated by an example virtual reality system, according to one example embodiment of the

present disclosure;

[0013] FIG. 3D illustrates a gowning simulation utilizing a first gloving functionality generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0014] FIG. 3E illustrates a gowning simulation utilizing a first gloving functionality generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0015] FIG. 3F illustrates a gowning simulation utilizing a first gloving functionality generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0016] FIG. 3G illustrates a gowning simulation utilizing a second gloving functionality generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0017] FIG. 3H illustrates a gowning simulation utilizing a second gowning functionality generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0018] FIG. 3I illustrates a gowning simulation utilizing a second gowning functionality generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0019] FIG. 3J illustrates a gowning simulation utilizing a second gowning functionality generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0020] FIG. 3K illustrates a gowning simulation utilizing a second gowning functionality generated by an example virtual reality system, according to one example embodiment of the

present disclosure;

[0021] FIG. 3M illustrates a gowning simulation utilizing a second gowning functionality generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0022] FIG. 3N illustrates a gowning simulation utilizing a completed gowning functionality generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0023] FIG. 3O illustrates a gowning simulation utilizing a height adjustment functionality generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0024] FIG. 4A is a schematic diagram of a method of using a selected gowning simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0025] FIG. 4B is a schematic diagram of a method of using a selected gowning simulation for unrolling gloves generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0026] FIG. 4C is a schematic diagram of a method of using a selected gowning simulation for unrolling gown sleeves generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0027] FIG. 4D is a schematic diagram of a method of using a selected gowning simulation responsive to errors generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0028] FIG. 5A illustrates a pipette simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0029] FIG. 5B illustrates a pipette simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0030] FIG. 5C illustrates a pipette simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0031] FIG. 5D illustrates a pipette simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0032] FIG. 5E illustrates a pipette simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0033] FIG. 5F illustrates a pipette simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0034] FIG. 5G illustrates a pipette simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0035] FIG. 5H illustrates a pipette simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0036] FIG. 6A is a schematic diagram of a method of using a selected pipette simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0037] FIG. 6B is a schematic diagram of a method of using a selected pipette simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure;

[0038] FIG. 6C is a schematic diagram of a method of using a selected pipette simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure; and

[0039] FIG. 6D is a schematic diagram of a method of using a selected pipette simulation generated by an example virtual reality system, according to one example embodiment of the present disclosure.

DETAILED DESCRIPTION

[0040] Referring now to the figures generally wherein like numbered features shown therein refer to like elements throughout unless otherwise noted. The present disclosure generally relates to an apparatus and methods for virtual reality training, and more particularly to methods and devices utilizing a processor device, visual outputs, sensor devices and special sensors combination for use in facilitating virtual reality simulations including a pipette simulation and/or a gowning simulation.

[0041] FIG. 1 illustrates a schematic diagram of a virtual reality system 100, in accordance with one of the exemplary embodiments of the disclosure. The virtual reality system 100 includes a processing device 110, a virtual reality headset, "headset 120", and at least one controller 130, where the processing device 110 is connectable and/or connected to the virtual reality headset 120 and the controller 130.

[0042] In one example embodiment, the processing device 110 includes a computing device (*e.g.* a database server, a file server, an application server, a computer, or the like) with computing capability and/or a processor 112. The processor comprises, a field programmable array (FPGA), a programmable logic device (PLD), an application specific integrated circuit (ASIC), a North Bridge, a South Bridge and/or other similar device or a combination thereof. The processor 112, may for example, comprise central processing unit (CPU), a programmable general purpose or special purpose microprocessor, a digital signal processor (DSP), a graphics

processing unit (GPU), and/or other similar device or a combination thereof.

[0043] The processing device 110 would generate images, audio, text, *etc.* that replicate a environments found in the real world, and/or environments generated to be perceived as the real world. The processing device 110 is in two-way communication with the virtual reality headset 120 and the at least one controller 130, wherein the headset and controller provide inputs to the processing device 110 that provides data about the user's actions and motions. The processing device 110 provides instructions to generate visual, audio, and/or text responsive to the inputs received, such that the user navigates and interacts with the virtual world. In one example embodiment, the processing device 110 is integrated with the virtual reality headset 120. In another example embodiment, the processing device 110 is in wired and/or wireless connection with the virtual reality headset 120.

[0044] It would be appreciated by having ordinary skill in the art that the processing device 110 would include a data storage device in various forms of non-transitory, volatile, and non-volatile memories which would store buffered or permanent data as well as compiled programming codes used to execute functions of the processing device 110. In another example embodiment, the data storage device can be external to and accessible by the processing device 110, the data storage device may comprise an external hard drive, cloud storage, and/or other external recording devices.

[0045] In one example embodiment, the processing device 110 is a remote computer system. The computer system includes desktop, laptop, tablet hand-held personal computing device, LAN, WAN, WWW, and the like, running on any number of known operating systems and are accessible for communication with remote data storage, such as a cloud, host operating computer, *via* a world-wide-web or Internet. In one example embedment, the controller 130 and VR (virtual reality) headset 120 both contain transceivers for sending and

receiving instructions.

[0046] In another example embodiment, the processing device 110 comprises a processor, a data storage, computer system memory that includes random-access-memory ("RAM"), read-only-memory ("ROM") and/or an input/output interface. The processing device 110 executes instructions by non-transitory computer readable medium either internal or external through the processor that communicates to the processor *via* input interface and/or electrical communications, such as from a secondary device (*e.g.,* smart phone, tablet, or other device) the controller 130 and/or the headset 120. In yet another example embodiment, the processing device 110 communicates with the Internet, a network such as a LAN, WAN, and/or a cloud, input/output devices such as flash drives, remote devices such as a smart phone or tablet, and displays.

[0047] The virtual reality headset 120 would be a head-mounted display or goggles 122 with a build-in head-tracking system. An example headset 120 made by Oculus Quest, which is incorporated by reference in its entirety for all purposes. The virtual reality headset 120 includes the integrated display 122, a headset motion sensor 114, a communication interface, and/or a user speakers 124, and a built-in processor for executing or reading instructions from memory, or an input for providing instructions to an output.

[0048] The display 122 may comprise one of a liquid crystal display (LCD), a light-emitting diode (LED) display, or the like. The motion sensor 114 may comprise a combination of an accelerometer (*e.g.* G-sensor), a gyroscope (*e.g.* gyro-sensor), and/or a sensor that detects the linear and/or rotational movement (*e.g.* rotational angular velocity or rotational angle) of the headset 120. In another example embodiment, the motion sensor includes one or more locators 142 that generate a motion sensing grid 144, wherein motion of the controller 130 and/or the headset 120 is monitored, and identified by the one or more

sensors. The controller 130 and/or the headset 120 include one or more sensed volumes, such that the motion sensing grid senses linear and/or rotational movement. The locator 142 includes, for example, a laser or an infrared transmitter and receiver. The locator 142 maps where the virtual reality headset 120 and the controller 130 are in three dimensional space. Further, the locators 142 *via* instruction from the processor 112 define boundaries of the virtual space to prevent the user from bumping into walls or collisions with physical objects while in the virtual world.

[0049] In one example embodiment, the locator 142 comprises base stations including, for example, a spinning laser sheet. Sensors 114, 116 on the headset 120 and controllers 130 detect transmit to the processor 112 when (*e.g.*, a specific time) the laser sheet passes various points on the headset 120 and/or the controller 130. The processor 112, utilizing a time the various points were detected, triangulates position and orientation of the controller 130 and/or headset 120 from the times. In another example embodiment, the sensor 114 of the headset 120 (*e.g.*, an Oculus Rift S or an Oculus Quest headset) comprises onboard cameras that transmit data to the processor 112, or comprising processing power themselves to calculate position and orientation *via* photogrammetry. In yet another example embodiment, the locator 142 comprises one or more cameras that detect lights that are projected from the headset 120 and controllers.

[0050] In the illustrated example embodiment, the headset 120 outputs headset motion data to the processing device 110 (*e.g.*, *via* the locator 142, and/or motion sensors) and the processor 112 of the processing device instruct the headset to display images on the user display 122 that correlate the headset motion data (*e.g.*, the user turns their head left, and the display alters to show a volume leftward of the user's original gaze).

[0051] In the illustrated example embodiment of FIG. 1, the controller 130 comprises a

handheld controller. In one example embodiment, the controller 130 is equipped with a handheld motion sensor 116, a tactile element 118, for example, a mouse, a joystick, a trackball, a touch pad, and/or buttons that permits the user to interact with environment, objects, or avatars in the virtual world (the virtual world is what is being displayed in the headset 120 based upon movement of the headset, the controller, and based upon instructions processed by processor 112, and or controller 130, these instructions are received by their respective inputs and processed by respective processor to provide non-transitory instructions to the respective devices 120, 130). In one example embodiment, such instructions are non-transitory, such as computer readable media, that can be transmitted to the devices of the system 100 to be processed on the respective processor of the respective devices 120, 130. The controller 130 communicates with the processing device 110, the locators 142, and/or the headset 120 via any wireless standard and/or is in wired communication with the processing device 110. It would be appreciated by one having ordinary skill in the art that handheld motion sensor includes sensors 116 located on the controller 130, and/or sensible elements that are sensed by other devices, such as the locator 142.

[0052] As illustrated in FIG. 2, a method 200 of use of the virtual reality system 100 is illustrated. At 202, a user, utilizing the virtual reality system 100 selects a laboratory simulation 300, 500. In this example embodiment, the user has access to a plurality of laboratory simulations which will be discussed in greater detail below. The user may select the laboratory simulation 300, 500 utilizing the controller 130 and/or the tactile element 118 of the controller, the processing unit 110 (*e.g.*, a mouse, keyboard, or the like in communication with the processing unit), and/or through eye and/or head motion sensed by the headset 120. At 204, the processor 112 generates the selected laboratory simulation 300, 500. In this example embodiment, the processor 112 identifies a simulation stored on the

processor, and/or stored at a remote location, and configures the laboratory simulation to be projected on the attached headset 120.

[0053] At 206, the processor 112 sends instructions to the headset 120 to project the selected laboratory simulation 300, 500 on the user display 122, to generate audio to be emitted from the user speakers 124, and/or rumbling, motion to be actualized at the headset 120 and/or the controller 130. In this example embodiment, the user holds, or otherwise controls the motion of the controller 130. At 208, a presence of the controller 130 in a working volume (*e.g.*, the motion sensing grid 144) is searched for. At 210, responsive to no controller 130 being detected, the processor 112 instructs that no icon 302 be shown on the user display 122. At 212, responsive to the controller 130 being detected, the processor 112 instructs that the icon 302, 508 be shown on the user display 122 (*see*, for example, FIGS. 3A-3J, 5). In one example embodiment, the icon 302, 508 comprises a hand, and/or hands, which mimic the user's hands in the virtual space or virtual world. At 214, the sensor 116 of the controller is activated to detect the user's hand motion. The sensor 116 may be detected by the locators 142. The user's hand motions, including lateral, longitudinal, rotational, axial, *etc.* is detected by the sensor 116. The sensor 114 of the headset 120 remains active while the user is in the virtual space.

[0054] At 216, responsive to the sensors 114, 116 detecting the motion of the user, the sensors 114, 116, the locators 142, and/or both transmit the motion to the processor 112. At 218, the processor 112 instructs the headset 120 to project the icons 302, 508 as moving in the same manner as detected by the sensors 116, and/or the locators 142 and/or alter the user's view on the user display 122 based upon the motion detected from the sensor 114. In this example embodiment, the icons 302, 508 will move up or down, side to side, rotationally, *etc.* relative to the user if the controller 130 is detected as moving up and down, side to side,

in and out, and/or rotationally. At 220, responsive to the sensor 116 not detecting the motion of the user, the sensors 114, 116, the locators 142, and/or all of them transmit that there is no motion to the processor 112. The processor 112 maintains instructions to project the selected laboratory simulation 300, 500 on the user display 122. The selected laboratory simulation 300, 500 includes the icons 302, 508 when the controller 130 is detected, as at 212, or does not include the icons 302 when the controller is not detected, as at 210.

[0055] **GOWNING SIMULATION 300**

[0056] As illustrated in FIG. 4A, a method 400 of use of the virtual reality system 100 with the interactive gowning simulation 300 is illustrated. At 402, the processor 112 receives a signal indicating the user has selected the interactive gowning simulation 300 (*see* FIG. 3A). At 404, the processor 112 generates the gowning simulation 300, including generating an image of a left and right hand 302a, 302b, a sterile sleeve pack 304, a sterile glove pack 306, and a work bench 310 and instructs the user display 122 to display the gowning simulation. At 406, the processor 112 generates and instructs the user display to display an initial gowning view 330 by presenting the left and right hand 302a, 302b, and the work bench 310. A gowning view comprises a heads-up display 334 that illustrates what a user would view in a work bench 310 in the real world. The initial gowning view 330 comprises the view prior to user input, and subsequent altered gowning views comprise the view including the user input. At 408, the processer 112 generates and instructs the user display 122 to display a sterile sleeve pack 304 and a sterile glove pack 306. (*see,* for example, FIG. 3A).

[0057] In one example embodiment, the processor 112 generates one or more gowning activations volumes. The one or more gowning activation volumes comprise Cartesian coordinate systems defining activation distances (*e.g.* between 6 inches to 12

inches) of the aspect to be activated. virtual workbench 310. Each of the one or more gowning activation distances defines a three-dimensional volume that extends along x, y, and z axes. In this example embodiment, the sensor 116 sends a signal to the processor 112 that the controller 130 is within one of the gowning activation volumes, causing said volume to be activated.

[0058] Steps 404-410 may be performed in any order, and/or may be performed simultaneously. In another example embodiment, the processer 112 instructs the user display 122 to display the sterile sleeve pack 304 and the sterile glove pack 306, responsive to the controller 130 being detected within an activation distance of the virtual workbench 310. At 410, the processor 112 designates a sleeve pack activation volume 312 and/or a glove pack activation volume 314 (*see* FIG. 3B) in Cartesian coordinate systems corresponding to the sterile sleeve pack 304 and the sterile glove pack 306. In this example embodiment, the sleeve and glove pack activation volumes 312, 314, as well as worn glove and worn gown activation volumes 322, 332, discussed below (*see* FIGS. 3G, 3L) comprise three dimensional spatial coordinate volumes radiating out along x, y, and z axes (hereinafter "volume" unless otherwise defined) from a central location (coordinates 0,0,0) wherein the respective aspect is located, or a center point of the respective aspect. In one example embodiment, the left and right hand 302a, 302b define right and left hand activation volumes 303a, 303b, that extend between 1 inch to about 4 inches along the x axis, between 1 inch to about 4 inches along the y axis, and/or between 1 inch to about 4 inches along the z axis, wherein responsive to any portion of the right and left hand activation volumes 303a, 303b enter or collide with a respective one of the gowning activation volumes that would activate the aspect of the respective volume. (*see* FIG. 3B). In this embodiment, the sleeve and glove pack activation volumes 312, 314, as well as worn glove and worn gown activation volumes

322, 332 extend between 1 inch to about 7 inches along the x axis, between 1 inch to about 7 inches along the y axis, and/or between 1 inch to about 7 inches along the z axis, wherein the volume defined within comprises the respective activation volumes. Inches in vertical space are based upon perceived distance by the user. At 412 the sensor 116 detects motion.

[0059] In another example embodiment, the activation volume is defined as an invisible collision volume or an absolute distance from various components (glove pack 304, sleeve pack 306, *etc.*). At 414, the sensor 116 detects motion in the sleeve pack activation volume 312. In this example embodiment, the sleeve pack activation volume 312 engulfs the sleeve pack 304 and extends between 0.5 inches to 2 inches from the sleeve pack. At 416, responsive to the sensor 116 detecting motion in the sleeve pack activation volume 312, the processor 112 generates image of a gown selection icon 320. (*see* FIG. 3B).

[0060] At 418, the virtual reality system 100 determines if the user is interacting with the tactile element 118 while the sensor 116 detects motion within sleeve pack activation volume 312. At 420, responsive to the actuation of the tactile element 118 while the controller 130 resides within the sleeve pack activation volume 312, the user display generates and displays a view of the user wearing gown sleaves 316a, 316b on the left and right arms of the user. (*see* FIG. 3C-3D). In one example embodiment, once the user is wearing the gown sleeves 316a, 316b, the sleeve pack 304 is removed from the work bench 310. In one example embodiment, responsive to the user not interacting with the tactile element 118 and/or the sensor 116 not detecting motion within the sleeve pack activation volume 312, the processor instructs the user display 122 to maintain presentation of the sleeve and glove packs 304, 306. Responsive to the tactile element 118 leaving the sleeve pack activation volume 312, the processor 112 instructs the user display 122 to revert to displaying the initial gowning view 330, and removes the presentation of the display gown

selection icon 320.

[0061] At 422, the sensor 116 detects motion in the glove pack activation volume 314. In this example embodiment, the glove pack activation volume 314 engulfs the glove pack 306 and extends between 0.5 inches to 2 inches from the glove pack. At 424, responsive to the sensor 116 detecting motion in the glove pack activation volume 314, the processor 112 generates image of a glove selection icon 330. (*see* FIG. 3E-3F).

[0062] At 426, the virtual reality system 100 determines if the user is interacting with the tactile element 118 while the sensor 116 detects motion within glove pack activation volume 314. At 428, responsive to the actuation of the tactile element 118 while the controller 130 resides within the glove pack activation volume 314, wherein the user is not wearing gown sleaves 316a, 316b, the processor displays an error message. Continued from section line D-D in FIG. 4A, illustrated in FIG. 4D as continuing from section line D-D, at 468, an error message stating the specific error is generated by the processor 112 and presented to the user. At 470, the processor 112 provides instruction on how to continue, including proceeding to any of the recited method steps of the method 400.

In one example embodiment, responsive to the user completing step 420, the processor 112 generates a glove visual indicator 323 of the glove pack activation volume 314. In one example embodiment, the glove visual indicator 323 periodically alters appearance, such as by color change, rhythmic or dysrhythmic pulsing of the visual indicator, by brightening or darkening the visual indicator, alternating color of the visual indicator, or the like. (*see* FIG. 3G-3H).

[0063] At 430, responsive to the actuation of the tactile element 118 while the controller 130 resides within the glove pack activation volume 314, wherein the user is wearing gown sleeves 316a, 316b, the user display generates and displays a view of the user

wearing gloves 318a, 318b on the left and right hands of the user. (*see* FIG. 3F-3H). In one example embodiment, responsive to the user not interacting with the tactile element 118 and/or the sensor 116 not detecting motion within the glove pack activation volume 314, the processor instructs the user display 122 to maintain presentation of the glove pack 306, or both the glove and sleeve pack 304, 306 wherein step 420 has not been successfully completed. In one example embodiment, responsive to the tactile element 118 leaving the glove pack activation volume 314, the processor 112 instructs the user display 122 to remove the presentation of the display glove selection icon 330.

[0064] As continued in example method 400 in FIG. 4B, continued from section line A-A, at 432, the processor 112 designates worn glove and worn sleeve activation volumes 322, 332. (*see* FIGS. 3H, 3L). In one example embodiment, the worn glove activation volume 322 corresponds to a location of a glove end, wherein in the real world the user would pull the glove end over the gown. At 434, the user actuates the tactile element 118 while the sensor 116 detects motion in one of the left or right worn glove activation volumes 322. At 436 responsive to the user actuating the tactile element 118 while the sensor 116 detects motion in one of the left or right worn glove activation volumes 322, and responsive to steps 420 and 430 being complete, the processor 112 instructs the user display 120 to display the selected left or right glove as an unrolled glove 320. (*see* FIG. 3J). At 438, responsive to the user failing to actuate the tactile element 118 while the sensor 116 detects motion in one of the left or right worn glove activation volumes 322, and responsive to steps 420 and 430 being complete, the processor 112 instructs the user display 120 to continue to display the worn gloves 318a, 318b and worn gown 316a, 316b. The step 438 of method 400 is continued from section line C-C in FIG. 4B, illustrated in FIGS. 4A, 4C as continuing from section line C-C. In one example embodiment, continuing from line C-C, the user may

resume method 400 at any step.

[0065] At 440, the user actuates the tactile element 118 while the sensor 116 detects motion in the other of the left or right worn glove activation volumes 322. At 442 responsive to the user actuating the tactile element 118 while the sensor 116 detects motion in the other of the left or right worn glove activation volumes 322, and responsive to steps 420 and 430 being complete, the processor 112 instructs the user display 120 to display the selected other of the left or right glove as the unrolled glove 320. (*see* FIGS. 3J-3K). At 444 responsive to the user failing to actuate the tactile element 118 while the sensor 116 detects motion in the other of the left or right worn glove activation volumes 322, and responsive to steps 420 and 430 being complete, the processor 112 instructs the user display 120 to continue to display a single worn glove 318 and a single unrolled glove 320 and worn gown 316a, 316b. (*see* for example, FIG. 3J) The step 444 of method 400 is continued from section line C-C in FIG. 4B, illustrated in FIGS. 4A, 4C as continuing from section line C-C. In one example embodiment, continuing from line C-C, the user may resume method 400 at any step.

[0066] As continued in example method 400 in FIG. 4C, continued from section line B-B, at 446, the user actuates the tactile element 118 while the sensor 116 detects motion in one of the left or right worn gown activation volumes 332. In one example embodiment, the worn gown activation volume 332 corresponds to a sleeve cuff of a gown, wherein in the real world the user would pull that the sleeve cuff of gown to complete gowning. (*see* FIG. 3L). At 448 responsive to the user actuating the tactile element 118 while the sensor 116 detects motion in one of the left or right worn gown activation volumes 332, the processor determines if the left and right hands have unrolled gloves 320a, 320b. In one example embodiment, responsive to the left and right hands have unrolled gloves 320a, 320b, the processor 112 generates a sleeve visual indicators 333 of the worn activation gown volumes

332. In one example embodiment, the sleeve visual indicators 333 periodically alters appearance, such as by color change, rhythmic or dysrhythmic pulsing of the visual indicator, by brightening or darkening the visual indicator, alternating color of the visual indicator, or the like. (see FIG. 3L-3M).

[0067] At 450 responsive to the user actuating the tactile element 118 while the sensor 116 detects motion in one of the left or right worn gown activation volumes 332 and the processor determining the left and right hands do not have unrolled gloves 320a, 320b, (*e.g.,* have rolled gloves) the processor displays an error message. Continued from section line D-D in FIG. 4A, illustrated in FIG. 4D as continuing from section line D-D, at 468, an error message stating the specific error is generated by the processor 112 and presented to the user. At 470, the processor 112 provides instruction on how to continue, including proceeding to any of the recited method steps of the method 400.

[0068] At 452 responsive to the user actuating the tactile element 118 while the sensor 116 detects motion in one of the left or right worn gown activation volumes 332 and the processor 112 determining the left and right hands have unrolled gloves 320a, 320b, the processor 112 instructs the user display 122 to display the selected left or right gown sleeves as an unrolled gown sleeve 322. (*see* FIG. 3N).

[0069] At 454, the user actuates the tactile element 118 while the sensor 116 detects motion in the other of the left or right worn gown activation volumes 332. At 456 responsive to the user actuating the tactile element 118 while the sensor 116 detects motion in the other of the left or right worn gown activation volumes 332, the processor determines if the left and right hands have unrolled gloves 320a, 320b. If the processor 112 determines the gloves are not unrolled, the method proceeds to step 450 described above.

[0070] At 452, responsive to the user actuating the tactile element 118 while the

sensor 116 detects motion in one of the left or right worn gown activation volumes 332 and the processor 112 determining the left and right hands have unrolled gloves 320a, 320b, the processor 112 instructs the user display 122 to display the selected left or right gown sleeves as an unrolled gown sleeve 322. (*see* FIG. 3N).

[0071] At 460, responsive to the user actuating the tactile element 118 while the sensor 116 detects motion in the other of the left or right worn gown activation volumes 332 and the processor determining the left and right hands have unrolled gloves 320a, 320b, the processor 112 instructs the user display 122 to display the other of the selected left or right gown sleeves as an unrolled gown sleeve 322. (*see* FIG. 3N). At 462, responsive to the completion of step 460, the processor 112 instructs the user display 122 to indicate the user has successfully gowned.

[0072] At 462, responsive to the user being successfully gowned, the processor 112 generates a sanitization wipe 350 and a wipe activation volume 352. In another example embodiment, the sanitization wipe 350 is present during the gowning process. In one example embodiment, responsive to actuating the tactile element 118 while the sensor 116 detects motion in the wipe activation volume 352, the sterile wipe is coupled to one or the other of the unrolled gloves 320a, 320b and wipes said gloves. (*see* FIG. 3O). In one example embodiment, the unrolled gloves 320a, 320b are then determined to be sterile. The user is then instructed to discard the sterile wipe into a biohazard container 354, wherein responsive to entering a biohazard activation volume 356 and responsive to actuating the tactile element 118 while the sensor 116 detects motion in the biohazard activation volume 356 discarding the sanitization wipe 350.

PIPETTE SIMULATION 500

[0073] As illustrated in FIG. 6, a method 600 of use of the virtual reality system 100

with the interactive pipette simulation 500 is illustrated. At 602, the processor 112 receives a signal indicating the user has selected the interactive pipette simulation 500 (*see* FIG. 5A). At 604, the processor 112 generates the pipette simulation 500, including generating an image of a left and right hand 508a, 508b, a pipette 502, a pipette aid 504, a pipette sleeve 506 and a work bench 510, and instructs the user display 122 to display the pipette simulation. At 606, the processor 112 generates and instructs the user display 122 to display an initial pipette view 530. The initial pipette view 530 comprises a heads-up display that illustrates what a user would view in a work bench 510 in the real world. The initial pipette view 530 comprises the view prior to user input, and subsequent altered pipette views comprise the view including the user input. At 608, the processer 112 generates and instructs the user display 122 to display the pipette 502, a pipette aid 504 in a sleeve 50, a left and right hand 508a, 508b of the user, one or more vials 520, and a biohazard discard bin 554. (*see,* for example, FIG. 5A).

[0074] Steps 604-610 may be performed in any order, and/or may be performed simultaneously. At 610, the processor 112 designates a pipette activation volume, vial activation volume, a pipette aid activation volume 314 and a pipette sleeve activation volume 316 (*see* FIGS. 5D-5E) in Cartesian coordinate systems corresponding to the one or more vials 520, the pipette 502, the pipette aid 504, and the pipette sleeve 506, respectively. In this example embodiment, the activation volumes 514, 516 comprise three dimensional spatial coordinate volumes radiating out along x, y, and z axes (hereinafter "volume" unless otherwise defined) from a central location (coordinates 0,0,0) wherein the respective aspect is located, or a center point of the respective aspect. Additional pipette use is described in PCT/US2023/015919 entitled Virtual reality simulation and method, which is assigned to Quality Executive Partners, Inc, and incorporated herein for all purposes.

[0075] At 612 the sensor 116 detects motion. In another example embodiment, the activation volume is defined as an invisible collision volume or an absolute distance from various components (pipette 502, pipette aid 504, pipette sleeve 506, vials 520 *etc.*). At 614, the sensor 116 detects motion in the pipette activation volume (not shown). In this example embodiment, the pipette activation volume engulfs a handle portion of the pipette 502 and extends between 0.5 inches to 2 inches from the handle of the pipette. At 616, responsive to the sensor 116 detecting motion in the pipette activation volume, the processor 112 generates image of a pipette selection icon and/or other visual indication that the pipette 502 has been selected. (*see* FIG. 5A).

[0076] At 618, the virtual reality system 100 determines if the user is interacting with the tactile element 118 while the sensor 116 detects motion within pipette activation volume. At 620, responsive to the actuation of the tactile element 118 while the controller 130 resides within the pipette activation volume, the user display generates and displays a view of the user holding the pipette 502 in one of the left or right hand 508a, 508b generating a pipette hand. (*see* FIG. 5B).

[0077] In one example embodiment, the user is successfully gowned as described in method 300. In one example embodiment, responsive to the user not interacting with the tactile element 118 and/or the sensor 116 not detecting motion within the pipette activation volume, the processor instructs the user display 122 to maintain presentation of the pipette 502 on the bench 510. Responsive to the controller 120 leaving the pipette activation volume, the processor 112 instructs the user display 122 to revert to displaying the initial gowning view 530. In one example embodiment, responsive to the sensor 116 detecting motion in the sleeve activation volume 516 in the hand not coupled to the pipette 502, the pipette sleeve 506 is opened to allow coupling of the pipette aid 504 to the pipette 502.

[0078] At 622, the sensor 116 detects motion in the pipette aid activation volume 514. In this example embodiment, the pipette aid activation volume 514 engulfs the pipette aid 504 and extends between 0.5 inches to 2 inches from the pipette aid. At 624, responsive to the sensor 116 detecting motion of the pipette 502 (*e.g.*, the pipette hand) in the pipette aid activation volume 514, the processor 112 generates image of a pipette aid icon and/or other visual indication that the pipette aid 504 has been selected. (not shown).

[0079] At 626, the virtual reality system 100 determines if the user is interacting with the tactile element 118 while the sensor 116 detects motion while the pipette 502 is within pipette aid activation volume 514. In one example embodiment, the pipette aid activation volume 514 is limited to a visible portion of the pipette aid 504 that extends outside off or is visible outside of the sleeve 506. At 628, responsive to the actuation of the tactile element 118 while the controller 130 that is not coupled to the pipette 502 resides within the pipette aid activation volume 514, wherein the user is not holding the pipette or is holding the pipette in a hand not entering the pipette aid activation volume 514, the processor displays an error message. Continued from section line D-D in FIG. 6A, illustrated in FIG. 6D as continuing from section line D-D, at 660, an error message stating the specific error is generated by the processor 112 and presented to the user. At 662, the processor 112 provides instruction on how to continue, including proceeding to any of the recited method steps of the method 600. In one example embodiment, responsive to the user completing step 620, the processor 112 generates a view of the user holding the pipette 502 coupled to the pipette aid 504. In one example embodiment, responsive to generating a view of the user holding the pipette 502 coupled to the pipette aid 504, the sleeve 506 is displayed as resting on the bench 510. (*see* FIG. 5B).

[0080] At 630, responsive to the actuation of the tactile element 118 while the

controller 130 coupled to the pipette 502 resides within the pipette aid activation volume 514, the user display 122 generates and displays a view of the user holding the pipette 502 coupled to the pipette aid 504. (*see* FIG. 3B). In one example embodiment, responsive to the user not interacting with the tactile element 118 and/or the sensor 116 not detecting motion within the pipette aid activation volume 514, the processor instructs the user display 122 to maintain presentation of the user holding the pipette 502. In one example embodiment, responsive to the tactile element 118 leaving the pipette aid activation volume 514, the processor 112 instructs the user display 122 to remove the presentation of the display pipette aid icon or other visual indication of selection.

[0081] As continued in example method 600 in FIG. 6B, continued from section line A-A, at 632, the processor 112 designates vial activation volumes. (*see* FIG. 3C). In one example embodiment, the vial activation volumes corresponds to a location of cap 522 of the vials 520 (*see* FIG. 5B), where in the real world the user would remove a cap from a vial. In one example embodiment, the user removes one of the caps 522 using the hand not holding the pipette 502. In one example embodiment, the cap 522 is removed by actuating the tactile element 118 while the non-pipette hand is within the vial activation volume. At 634, the user actuates the tactile element 118 while the sensor 116 detects motion the hand 508 holding the pipette 502 moving at least a portion of the pipette aid 504 into the vial activation volume. At 636 responsive to the user actuating the tactile element 118 while the sensor 116 detects motion of the pipette aid 504 in one of the vial activation volumes, and responsive to steps 620 and 630 being complete, the processor 112 instructs the user display 120 to display the pipette aid 504 in the selected vial 520. (*see* FIG. 5C). At 538, responsive to the user failing to actuate the tactile element 118 while the sensor 116 detects motion in motion of the pipette aid 504 in one of the vial activation volumes, and responsive to steps 620 and 630 being

complete, the processor 112 instructs the user display 120 to continue to display the user holding the pipette 502 coupled to the pipette aid 504. The step 638 of method 600 is continued from section line C-C in FIG. 6B, illustrated in FIGS. 6A, 6C as continuing from section line C-C. In one example embodiment, continuing from line C-C, the user may resume method 600 at any step.

[0082] At 640, the user actuates the tactile element 118 while the sensor 116 detects motion in one of the other of the vial activation volumes. At 642 responsive to the user actuating the tactile element 118 while the sensor 116 detects motion of the pipette aid 504 in one or the other of the vial activation volumes, and responsive to steps 620 and 630 being complete and responsive to the pipette aid 504 being empty upon insertion, the processor 112 instructs the user display 120 to display the pipette aid 504 up-taking liquid from the vial 520. (*see* FIGS. 5C). Alternatively, at 640, the user actuates the tactile element 118 while the sensor 116 detects motion in one of the other of the vial activation volumes. At 642 responsive to the user actuating the tactile element 118 while the sensor 116 detects motion of the pipette aid 504 in one or the other of the vial activation volumes, and responsive to steps 620 and 630 being complete and responsive to the pipette aid 504 having liquid residing therein, the processor 112 instructs the user display 120 to display the pipette aid 504 dispensing liquid into the vial 520. (*see* FIG. 5C).

[0083] At 644 responsive to the user failing to actuate the tactile element 118 while the sensor 116 detects motion of the pipette aid 504 in one or the other of the vial activation volumes, and responsive to steps 620 and 630 being complete, the processor 112 instructs the user display 120 to continue to display either an empty or liquid filed pipette aid 504. (*see* for example, FIG. 5C). The step 644 of method 600 is continued from section line C-C in FIG. 6B, illustrated in FIGS. 6A, 6C as continuing from section line C-C. In one example

embodiment, continuing from line C-C, the user may resume method 600 at any step. In one example embodiment, responsive to the non-pipette hand 508a entering the sleeve activation volume 516, the sleeve 506 is displayed as coupled to or held by the non-pipette hand. In another example embodiment, responsive to the non-pipette hand 508a entering the sleeve activation volume 516 and the tactile element 118 being actuated while residing therein, the sleeve 506 is displayed as coupled to or held by the non-pipette hand.

[0084] As continued in example method 600 in FIG. 6C, continued from section line B-B, at 646, the sensor 116 detects overlap of the sleeve activation volume 516 and the aid activation volume 514. In one example embodiment, the overlap of the sleeve activation volume 516 and the aid activation volume 514 occurs when between 70% to about 100% of the aid activation volume 514 resides in the sleeve activation volume 516. (*see* FIG. 5E). In one example embodiment, the overlap of the sleeve activation volume 516 and the aid activation volume 514 occurs when between 50% to about 100% of the aid activation volume 514 resides in the sleeve activation volume 516. In another example embodiment, the overlap of the sleeve activation volume 516 and the aid activation volume 514 occurs when at least 80% of the aid activation volume 514 resides in the sleeve activation volume 516. In this example embodiment, the aid activation volume 514 is less than the sleeve activation volume 516. In this embodiment, the pipette aid and pipette sleeve activation volumes 514, 516 extend between 0.2 inches to about 1.5 inches along the x axis, between 0.2 inches to about 1.5 inches along the y axis, and/or between 0.2 inches to about 1.5 inches along the z axis, wherein the volume defined within comprises the respective activation volumes. Inches in vertical space are based upon perceived distance by the user. In one example embodiment, the pipette sleeve activation volume 514 is close to or matches a visual edge of the pipette aid 504.

[0085] At 648 responsive to the sensor 116 detecting overlap of the sleeve activation volume 516 and the aid activation volume 514, the processor 112 determines if the overlap has occurred for at least a first duration, responsive to the overlap occurring for the first duration, the pipette aid 504 is displayed as uncoupled from the pipette 502 and coupled to and residing within the sleeve 506. (*see* FIG. 5F). In one example embodiment, the user is holding the sleeve 506 during reinsertion of the pipette aid 504. In one example embodiment, the sleeve activation volume 516 and the aid activation volume 514 cannot overlap if the sleeve 506 is not being held by the user. In another example embodiment, the sleeve 506 resides on the bench during reinsertion of the pipette aid 504. In one example embodiment, the first duration is between 0.5 seconds to about 5 seconds. In another example embodiment, the first duration is 1 second. In yet another example embodiment, the first duration is 3 seconds. Stated another way, the user display 122 displays the pipette aid 504 as disconnected from the pipette (*e.g.*, it no longer moves when the hand 508b holding the pipette moves), and residing within the pipette sleeve 506 (*e.g.*, the pipette aid moves when the hand 508a holding the pipette sleeve moves). In another example embodiment, the pipette aid 504 disconnects from the pipette 502 responsive to the pipette aid activation volume 514 being within the pipette sleeve activation volume 516 for any duration.

[0086] At 650 responsive to the sleeve activation volume 516 and the aid activation volume 514 overlapping for less than the first duration or not overlapping by the designated percentage and/or the user not having the sleeve 506 in the non-pipette hand, the processor 112 instructs the user display 122 to maintain presentation of the pipette aid 504 coupled to the pipette 502. At 652, the processor 112 determines if the user has actuated the tactile element 118 while the sensor 116 detects motion of the pipette aid 504 residing within the sleeve 506 within a bin activation volume 556. At 656, responsive to the user actuating the

tactile element 118 while the sensor 116 detects motion of the pipette aid 504 residing within the sleeve 506 within a bin activation volume 556 of the biohazard discard bin 554, the processor 112 instructs the user display 122 to display the pipette aid 504 residing within the sleeve 506 as being discarded in the biohazard discard bin 554. (*see* FIGS. 5G-5H).

[0087] At 454 responsive to the user failing to actuate the tactile element 118 while the sensor 116 detects motion of the pipette aid 504 residing within the sleeve 506 within a bin activation volume 556 of the biohazard discard bin 554, the processor 112 continues to display the user holding the pipette aid 504 residing within the sleeve 506. At 458, responsive to the completion of step 656, the processor 112 instructs the user display 122 to indicate the user has successfully utilized the pipette 502.

[0088] In the foregoing specification, specific embodiments have been described. However, one of ordinary skill in the art appreciates that various modifications and changes can be made without departing from the scope of the disclosure as set forth in the claims below. Accordingly, the specification and figures are to be regarded in an illustrative rather than a restrictive sense, and all such modifications are intended to be included within the scope of present teachings.

[0089] The benefits, advantages, solutions to problems, and any element(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential features or elements of any or all the claims. The disclosure is defined solely by the appended claims including any amendments made during the pendency of this application and all equivalents of those claims as issued.

[0090] Moreover in this document, relational terms such as first and second, top and bottom, and the like may be used solely to distinguish one entity or action from another entity or action without necessarily requiring or implying any actual such relationship or order

between such entities or actions. The terms "comprises," "comprising," "has", "having," "includes", "including," "contains", "containing" or any other variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises, has, includes, contains a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. An element proceeded by "comprises ...a", "has ...a", "includes ...a", "contains ...a" does not, without more constraints, preclude the existence of additional identical elements in the process, method, article, or apparatus that comprises, has, includes, contains the element. The terms "a" and "an" are defined as one or more unless explicitly stated otherwise herein. The terms "substantially", "essentially", "approximately", "about" or any other version thereof, are defined as being close to as understood by one of ordinary skill in the art. In one non-limiting embodiment the terms are defined to be within for example 10%, in another possible embodiment within 5%, in another possible embodiment within 1%, and in another possible embodiment within 0.5%. The term "coupled" as used herein is defined as connected or in contact either temporarily or permanently, although not necessarily directly and not necessarily mechanically. A device or structure that is "configured" in a certain way is configured in at least that way, but may also be configured in ways that are not listed.

[0091] To the extent that the materials for any of the foregoing embodiments or components thereof are not specified, it is to be appreciated that suitable materials would be known by one of ordinary skill in the art for the intended purposes.

[0092] The Abstract of the Disclosure is provided to allow the reader to quickly ascertain the nature of the technical disclosure. It is submitted with the understanding that it will not be used to interpret or limit the scope or meaning of the claims. In addition, in the

foregoing Detailed Description, it can be seen that various features are grouped together in various embodiments for the purpose of streamlining the disclosure. This method of disclosure is not to be interpreted as reflecting an intention that the claimed embodiments require more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive subject matter lies in less than all features of a single disclosed embodiment. Thus the following claims are hereby incorporated into the Detailed Description, with each claim standing on its own as a separately claimed subject matter.

CLAIMS

What is claimed is:

1. A non-transitory computer readable medium storing instructions executable by an associated processor to perform a method for implementing a gowning simulation, the method comprising:

generating a three-dimensional initial view based upon a view selection input by a user;

sending instructions to present the initial view to a user display of a headset, the user display comprised within the headset;

receiving an input from controllers comprising at least one sensor indicating user movement within the initial view;

accessing memory to present a glove pack and a gown sleeve pack;

assigning a glove pack activation volume to the glove pack and assigning a gown sleeve pack activation volume to the gown sleeve pack;

responsive to detecting a first controller of the controllers within the gown sleeve pack activation volume, generating and presenting an image of the user wearing a first gown sleeve on a first arm; and

responsive to detecting a second controller of the controllers within the gown sleeve pack activation volume, generating and presenting an image of the user wearing a second gown sleeve on a second arm.

2. The method of claim 1, responsive to detecting the second controller within the glove

pack activation volume and the user being assigned as wearing the gown sleeves on the first and second arms, generating and presenting an image of the user wearing a first glove from the glove pack on the first arm, the first glove residing at least partially over the gown sleeves on the first arm.

3. The method of claim 2, responsive to detecting the first controller within the glove pack activation volume and the user being assigned as wearing the gown sleeves on the first and second arms, generating and presenting an image of the user wearing a second glove from the glove pack on the second arm, the second glove residing at least partially over the gown sleeves on the second arm.

4. The method of claim 3, further comprising assigning worn glove activation volumes to the first and second gloves worn by the user.

5. The method of claim 4, further comprising responsive to detecting the second controller within a first worn glove activation volume of the worn glove activation volumes, generating and presenting an image of the user unrolling the first worn glove.

6. The method of claim 5, further comprising responsive to detecting the first controller within a second worn glove activation volume of the worn glove activation volumes, generating and presenting an image of the user unrolling the second worn glove.

7. The method of claim 6, further comprising assigning worn gown activation volumes to the first and second gown sleeves having first and second unrolled gloves present thereon.

8. The method of claim 7, further comprising responsive to detecting the second controller within a first worn gown activation volume of the first unrolled glove, presenting an image of a cuff of the first sleeve at least partially residing over the first unrolled glove.

9. The method of claim 8, further comprising responsive to detecting the first controller within a second worn gown activation volume of the second unrolled glove, presenting an image of a cuff of the second sleeve at least partially residing over the second unrolled glove and generating and presenting an image of the user being fully gowned.

10. A virtual reality system for providing a gowning simulation, the system comprising:

a processing device having a processor configured to perform a predefined set of operations in response to receiving a corresponding input from at least one of virtual reality headset and first and second controllers, the processing device comprising memory, wherein a three-dimensional initial view of a gowning simulation is stored, the initial view comprising first and second hand icons, a glove pack and a sleeve pack, the first hand icon coupled to a first controller and the second hand icon coupled the second controller;

the processor instructs the initial view to be presented on a user display comprised within the headset;

at least one of the first and second controller sends an input to the processor indicating the controller is moving within the initial view;

the processor assigns a glove pack activation volume to the glove pack and assigns a gown sleeve pack activation volume to the gown sleeve pack;

responsive to the first controller sending inputs indicating that the first controller of is

within the gown sleeve pack activation volume, the processor generates and presents an image of the user wearing a first gown sleeve on a first arm of the first hand icon; and

responsive to the second controller sending inputs indicating that the second controller of is within the gown sleeve pack activation volume, the processor generates and presents an image of the user wearing a second gown sleeve on a second arm of the second hand icon.

11. The system of claim 10, wherein responsive to the processor detecting the second controller within the glove pack activation volume and the user being assigned as wearing the gown sleeves on the first and second arms, the processor generates and presents an image of the user wearing a first glove from the glove pack on the first arm, the first glove residing at least partially over the gown sleeves on the first arm, and responsive to detecting the first controller within the glove pack activation volume and the user being assigned as wearing the gown sleeves on the first and second arms, the processor generates and presents an image of the user wearing a second glove from the glove pack on the second arm, the second glove residing at least partially over the gown sleeves on the second arm.

12. The system of claim 11, wherein the processor assigns worn glove activation volumes to the first and second gloves worn by the user.

13. The system of claim 12, wherein responsive to detecting the second controller within a first worn glove activation volume of the worn glove activation volumes, the processor generates and presents an image of the user unrolling the first worn glove and responsive to

detecting the first controller within a second worn glove activation volume of the worn glove activation volumes, the processor generates and presents an image of the user unrolling the second worn glove.

14. The system of claim 13, wherein the processor assigns worn gown activation volumes to the first and second gown sleeves having first and second unrolled gloves present thereon.

15. The system of claim 13, wherein responsive to detecting the second controller within a first worn gown activation volume of the first unrolled glove, the processor presents an image of a cuff of the first sleeve at least partially residing over the first unrolled glove and responsive to detecting the first controller within a second worn gown activation volume of the second unrolled glove, the processor presents an image of a cuff of the second sleeve at least partially residing over the second unrolled glove and generating and presenting an image of the user being fully gowned.

16. A virtual reality system for providing a pipette simulation, the system comprising:

a processing device having a processor configured to perform a predefined set of operations in response to receiving a corresponding input from at least one of virtual reality headset and first and second controllers, the processing device comprising memory, wherein a three-dimensional initial view of a pipette simulation is stored, the initial view comprising a pipette held by a first hand icon, a pipette aid coupled to the pipette, and a pipette sleeve held by a second hand icon;

the processor instructs the initial view to be presented on a user display comprised within the headset;

at least one of the first and second controller sends an input to the processor indicating the controller is moving within the initial view;

the processor instructs the movement of the first controller, comprising the hand icon holding the pipette, and movement of the second controller, holding the pipette sleeve, to be presented on the user display;

the processor assigns the pipette aid a pipette aid activation volume and the processor assigns the pipette sleeve a pipette sleeve activation volume; and

responsive to the first and second controllers sending inputs indicating that pipette aid activation volume is within the pipette sleeve activation volume for a threshold duration, the processor generates and displays the pipette aid as uncoupled from the pipette aid and uncoupled to movement of the first controller, and coupled to and residing within the pipette sleeve, and coupled to movement of the second controller.

17. The system of claim 16, wherein the pipette aid activation volume is indicated to be within the pipette sleeve activation volume when at least seventy percent of the pipette aid activation volume resides within the pipette sleeve activation volume.

18. The system of claim 16, wherein the threshold duration is between 0.5 seconds to about 4 seconds.

19. The system of claim 16, wherein the pipette aid activation volume mimics a shape of the pipette aid and the pipette sleeve activation volume mimics a shape of the pipette sleeve.

20. The system of claim 16, wherein the pipette aid activation volume is less than the

pipette sleeve activation volume