

INTERACTION WITH A MULTI-COMPONENT DISPLAY

RELATED APPLICATIONS

[0001] The present application is a continuation of U.S. patent application Ser. No. 10/048,638, filed Feb. 1, 2002, naming Gabriel D. Engel and Pita Witehira as inventors, assigned to the assignee of the present invention, and having attorney docket number PURE-P004, which claims the benefit of International Application Number PCT/NZ00/00143, filed Aug. 1, 2000, which claims the benefit of New Zealand Patent Number 336212, filed Aug. 1, 1999. Each of these applications is incorporated herein by reference in their entirety and for all purposes.

BACKGROUND OF THE INVENTION

[0002] Since our eyes naturally perceive depth, it is seen as a disadvantage that most display systems are two dimensional. Furthermore, there are many applications of displays where the realism of depth would improve the effectiveness of the display. Thus many attempts have been made to create display systems with depth.

[0003] A number of display systems that present an image of depth have been developed.

[0004] One class of such displays requires the viewer to wear some form of eye shield system by which various means allows the viewer's two eyes to see different images that are concurrently displayed on the same two dimensional screen. However, many users find it unsatisfactory to wear eye shields, while the method of providing two different images on the same screen is cumbersome and inconvenient for many applications.

[0005] A related but different class of displays presents a different image to each eye by means of a binocular image system in close proximity to both eyes. This method, however, is restricted in the number of viewers who can use the system and again many users find it unsatisfactory and uncomfortable to use.

[0006] A third class of display uses modifications of the two dimensional screen surface wherein two images are created on the screen, but by manipulation of multiple refractors on the screen, for a viewer in the correct position one image is refracted into the right eye, and the other image is refracted into the left eye.

[0007] This system requires the users to be carefully placed, is inflexible and has not found favor with many users.

[0008] The major problems with these systems were overcome by the innovative screen techniques disclosed in PCT Patent Application No's. PCT/NZ98/00098 and PCT/NZ99/00021 which detail a screen system producing a perception of depth comprising at least two screens placed such that their axes are approximately co-linear, with each screen separated from the other in the direction of the normal, wherein an image, or part of an image, displayed on one or more screens can be selectively made transparent, opaque or partially opaque as desired.

[0009] It has been found however that even with these types of screens there are some applications where the operator needs more control of the images, such as with computer games and other interactive programs—for example training programs.

[0010] It is an object of the present invention to address the foregoing problems or at least to provide the public with a useful choice.

[0011] Further aspects and advantages of the present invention will become apparent from the ensuing description which is given by way of example only.

SUMMARY OF THE INVENTION

[0012] According to one aspect of the present invention there is provided an interactive imaging system with depth, including at least two screens configured to show a 3-dimensional image characterized in that a user can manipulate one or more parts of an image displayed, by the means of using one or more on-screen touch control means.

[0013] It should be understood that in preferred embodiments of the present invention the 3 dimensional composite image, spread over two or more screens, can be interactive with any sort of controls, in particular with "touch" controls on a screen or on a clear panel in front of the front screen.

[0014] It should be further understood that in preferred embodiments the "touch" control can be activated by a variety of items including, but not limited to, pointers, pens, fingers or pencils.

[0015] One form of touch control means can be an image of a "button" on the front and/or rear screens which when touched can flip between 2 or more screens to show the information relating to the button, or can perform an operation associated with that button.

[0016] According to another aspect of the present invention there is provided an interactive imaging system with depth, including at least two screens configured to show a 3-dimensional image characterized in that at least one part of the image, displayed on one or more of the screens, can be manipulated by the actions of the user by using one or more control means.

[0017] In preferred embodiments of the present invention a user can manipulate one or more parts of an image by using one or more control means located on or near the screens, these control means can be in the form of a standard "key-press" button or a type of joystick control or may even be "touch" controls located on at least one touchpad adjacent to the screen, any of which can be readily purchased "off the shelf."

[0018] It would be clear to anyone skilled in the art that these are all "off the shelf" items that are readily available.

[0019] According to a further aspect of the present invention there is provided an interactive imaging system which creates a perception of depth, including at least two screens configured to show a 3-dimensional image characterized in that at least one part of the image, displayed on one or more of the screens, can be manipulated by the actions of the user by using one or more control means, and the information necessary to generate at least part of an image can be transmitted from or received by the display apparatus via the internet or by another suitable communications means.

[0020] In preferred embodiments of the present invention there is provided a method of controlling at least part of an image displayed on an interactive imaging system which creates a perception of depth including at least two screens configured to show a 3-dimensional image characterized by the step of manipulating, by the actions of the user, at least one or more parts of an image displayed on the interactive imaging system.