CLAIMS

What is claimed is:

1. A computer system for managing multiple distinct perspectives within a mixed-reality design environment, comprising:

one or more processors; and

one or more computer-readable media having stored thereon executable instructions that when executed by the one or more processors configure the computer system to perform at least the following:

load a three-dimensional architectural model into memory, wherein:

the three-dimensional architectural model is associated with a virtual coordinate system, and

the three-dimensional architectural model comprises at least one virtual object that is associated with an independently executable software object that comprises independent variables and functions that are specific to a particular architectural element that is represented by the at least one virtual object, the independently executable software object comprising a set of computer-executable instructions used in object-oriented program code , and which relate to a particular physical component or feature;

associate the virtual coordinate system with a physical coordinate system within a real-world environment;

transmit to each device of multiple different devices rendering information, wherein the rendering information comprises:

three-dimensional image data comprising rendering instructions for the at least one virtual object within least a portion of the three-dimensional architectural model, and

coordinate information that maps the virtual coordinate system to the physical coordinate system;

receive from a particular device of the multiple different devices a ray that extends from a particular portion of a user's perspective towards a rendered portion of the three-dimensional architectural model;

determine that the ray intersects with the at least one virtual object that is associated with the independently executable software object;

identify one or more functions associated with the independently executable software object that is associated with the at least one virtual object; and

generate a command interface that depicts one or more commands related to the one or more functions, wherein the command interface is generated within the three-dimensional architectural model rendered by the particular device.

2. The computer system as recited in claim 1, wherein determining that the ray intersects with a rendered representation of the at least one virtual object, comprises:

extending the ray within the three-dimensional architectural model until it intersects the at least one virtual object.

3. The computer system as recited in claim 1, wherein the command interface is only generated within the three-dimensional architectural model that is rendered by the particular device.

4. The computer system as recited in claim 1, wherein the ray comprises coordinates within the three-dimensional architectural model and a direction.

5. The computer system as recited in claim 4, wherein the coordinates within the three-dimensional architectural model comprises a set of coordinates associated with a center of a user's field-of-view.

6. The computer system as recited in claim 1, wherein the executable instructions include instructions that are executable to configure the computer system to:

update at least a portion of the three-dimensional architectural model;

generate an updated three-dimensional image data that incorporates the updated portion; and

transmit to each device of the multiple different devices updated rendering information, wherein the updated rendering information comprises the updated three-dimensional image data.

7. The computer system as recited in claim 1, wherein the three-dimensional image data consists of geometry information and texture information describing objects within the three-dimensional architectural model.

8. The computer system as recited in claim 1, wherein additional rendering information is only transmitted when a change is made to the three-dimensional architectural model.

9. A computer-implemented method for managing multiple distinct perspectives within a mixed-reality design environment, the method comprising:

loading a three-dimensional architectural model into memory, wherein:

the three-dimensional architectural model is associated with a virtual coordinate system, and

the three-dimensional architectural model comprises at least one virtual object that is associated with an independently executable software object that comprises independent variables and functions that are specific to a particular architectural element that is represented by the at least one virtual object, the independently executable software object comprising a set of computer-executable instructions used in object-oriented program code , and which relate to a particular physical component or feature;

associating the virtual coordinate system with a physical coordinate system within a real-world environment;

transmitting to each device of multiple different devices rendering information, wherein the rendering information comprises:

three-dimensional image data comprising rendering instructions for the at least one virtual object within least a portion of the three-dimensional architectural model, and

coordinate information that maps the virtual coordinate system to the physical coordinate system;

receiving from a particular device of the multiple different devices a ray that extends from a particular portion of a user's perspective towards a rendered portion of the three-dimensional architectural model;

determining that the ray intersects with the at least one virtual object that is associated with the independently executable software object;

identifying one or more functions associated with the independently executable software object that is associated with the at least one virtual object; and

generating a command interface that depicts one or more commands related to the one or more functions, wherein the command interface is generated within the three-dimensional architectural model rendered by the particular device.

10. The computer-implemented method as recited in claim 10, further comprising:

extending the ray within the three-dimensional architectural model until it intersects the at least one virtual object.

11. The computer-implemented method as recited in claim 10, wherein the visual object is only generated within the three-dimensional architectural model that is rendered by the particular device.

12. The computer-implemented method as recited in claim 10, wherein the ray comprises coordinates within the three-dimensional architectural model and a direction.

13. The computer-implemented method as recited in claim 12, wherein the coordinates within the three-dimensional architectural model comprises a set of coordinates associated with a center of a user's field-of-view.

14. The computer-implemented method as recited in claim 9 further comprising:

updating at least a portion of the three-dimensional architectural model;

generating an updated three-dimensional image data that incorporates the updated portion; and

transmitting to each device of the multiple different devices updated rendering information, wherein the updated rendering information comprises the updated three-dimensional image data.

15. The computer-implemented method as recited in claim 9, wherein the three-dimensional image data consists of geometry information and texture information describing objects within the three-dimensional architectural model.

16. The computer-implemented method as recited in claim 9, wherein additional rendering information is only transmitted when a change is made to the three-dimensional architectural model.

17. A system for managing multiple distinct perspectives within a mixed-reality design environment, comprising:

a mixed-reality server comprising executable instructions that when executed configure the mixed-reality server to perform at least the following:

load a three-dimensional architectural model into memory, wherein:

the three-dimensional architectural model is associated with a virtual coordinate system, and

the three-dimensional architectural model comprises at least one virtual object that is associated with an independently executable software object that comprises independent variables and functions that are specific to a particular architectural element that is represented by

the at least one virtual object, the independently executable software object comprising a set of computer-executable instructions used in object-oriented program code , and which relate to a particular physical component or feature;

associate the virtual coordinate system with a physical coordinate system within a real-world environment; and

transmit rendering information to a first mixed-reality device and a second mixed-reality device, wherein the rendering information comprises:

three-dimensional image data comprising rendering instructions for the at least one virtual object within least a portion of the three-dimensional architectural model, and

coordinate information that maps the virtual coordinate system to the physical coordinate system;

the first mixed-reality device comprising executable instructions that when executed configure the first mixed-reality device to perform at least the following:

based upon the three-dimensional image data, render a first mixed-reality environment from a first perspective that is unique to the first mixed-reality device;

receive from the first mixed-reality device a first ray (430) that extends from a particular portion (300) of the first perspective towards a rendered portion of the three-dimensional architectural model;

determine that the first ray intersects with the at least one virtual object that is associated with the independently executable software object;

identify one or more functions associated with the independently executable software object that is associated with the at least one virtual object; and

generate a command interface that depicts one or more commands related to the one or more functions, wherein the command interface is generated within the three-dimensional architectural model rendered by the first mixed-reality device; and

the second mixed-reality device comprising executable instructions that when execute configure the second mixed-reality device to perform at least the following:

based upon the three-dimensional image data, render a second mixed-reality environment from a second perspective that is unique to the second mixed-reality device; and

in response to a user input, communicate a second ray to the mixed-reality server.

18. The system as recited in claim 17, wherein:

the first ray comprises a first set of coordinates associated with a center of a user's field-of-view associated with the first mixed-reality device; and

the second ray comprises a second set of coordinates associated with a center of a user's field-of-view associated with the second mixed-reality device.