Deep Exploration 5.0 Tutorial
Camera Path Trajectory Editing #1

Welcome to the world of 3D with Right Hemisphere!

The aim of this tutorial is to learn how to use Deep Exploration to:

- Create a camera path and camera target.
- Edit a camera path trajectory interactively.

Assumptions

Certain assumptions have been made regarding this tutorial:

- You should be familiar with 3D concepts.
- You should be familiar in the use of Deep Exploration.
- Note that the display of the model on your computer during this tutorial may be different depending on the graphics card installed on your computer, the screen geometry, and the colors and placement of objects that you choose.

Features Covered

- Understanding and creating a camera path.
- Editing a camera path.

Requirements

The following software and files are required for this tutorial:

- Deep Exploration CAD Edition version 5.0.x.
- The file ‘Gearbox.rh’ accessible to your computer.

Completion Time

This tutorial should take approximately 30 minutes to complete.

Before You Begin

- Ensure you have the 3D file accessible to your computer.

Follow On

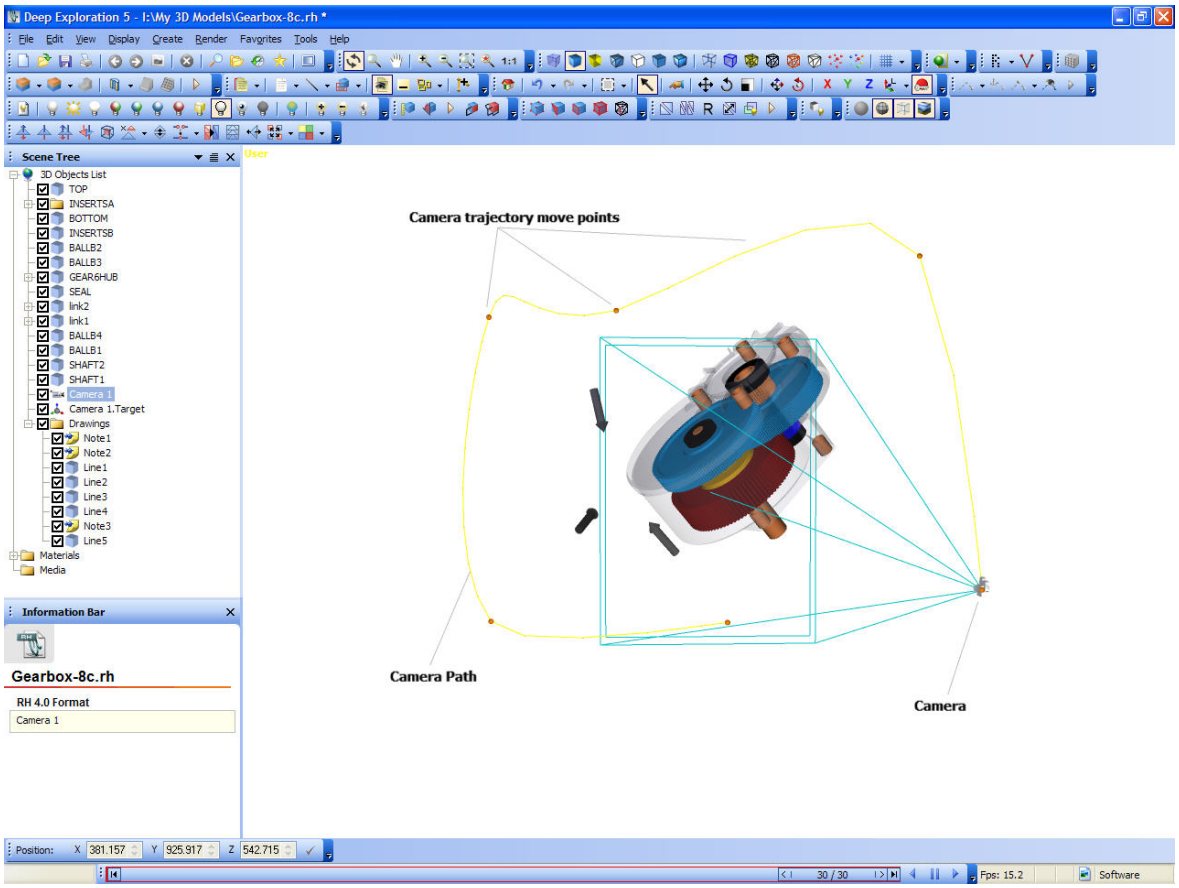
- The second tutorial in this series covers creating and changing the target camera path.

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Understanding Camera Paths

After creating a camera, either the camera object or the camera object and associated target node are displayed in the Scene Components panel depending on the type of camera created. You can modify these objects as you would modify other 3D objects. For example, selecting, hiding, and deleting, and attaching camera objects to groups.

When navigating the viewport, the default user view is used to view the scene. However, if you navigate the viewport with a camera object view activated and Edit Keyframes selected, the camera object view remains active and the camera moves about the scene.



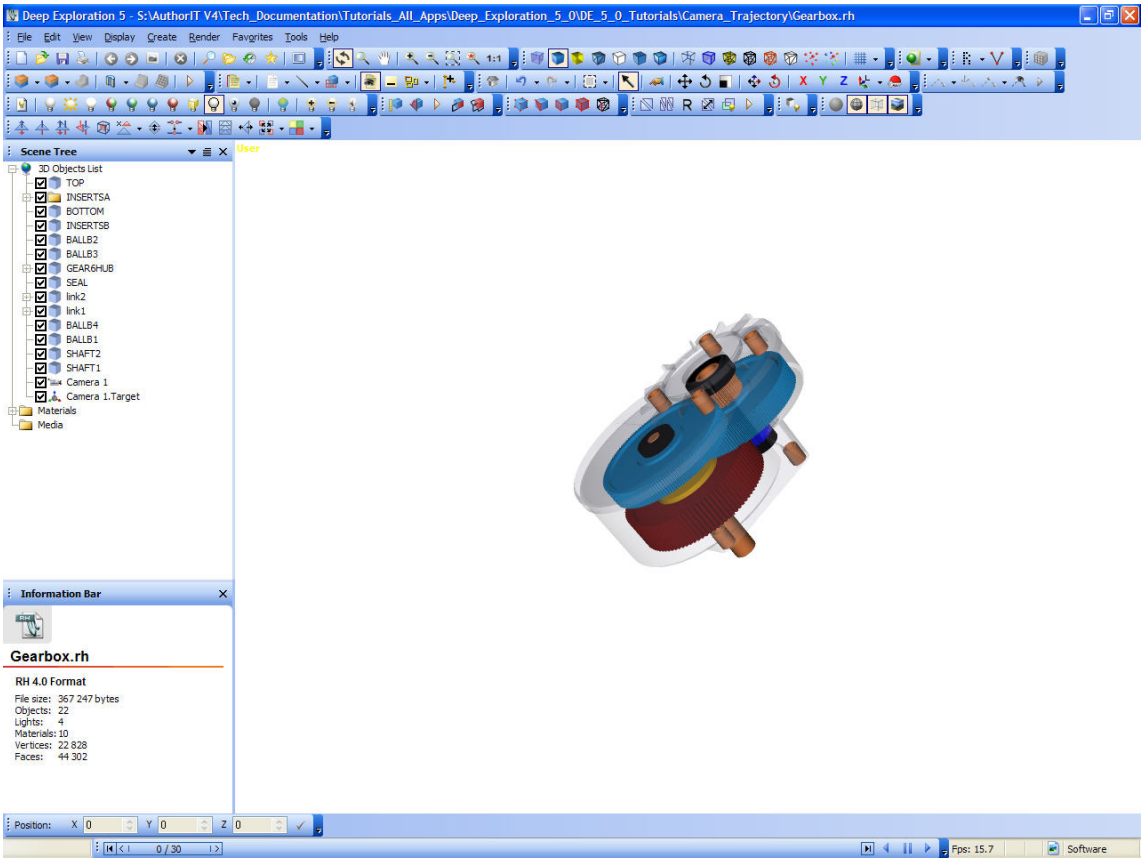
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Creating a Camera Path

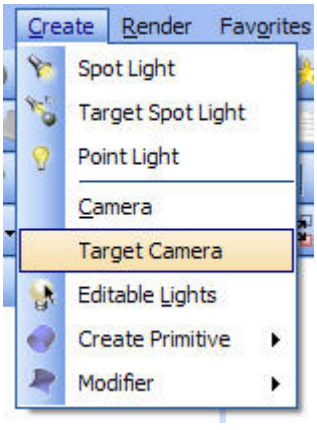
To create a camera path:

1 From the **File** menu select **Open** and navigate to the file **Gearbox.rh**.

2 When the file has loaded hide the **Steps**, **Model Views** and **Folders** panels, your screen should look like this:



3 From the **Create** menu, select **Target Camera**.

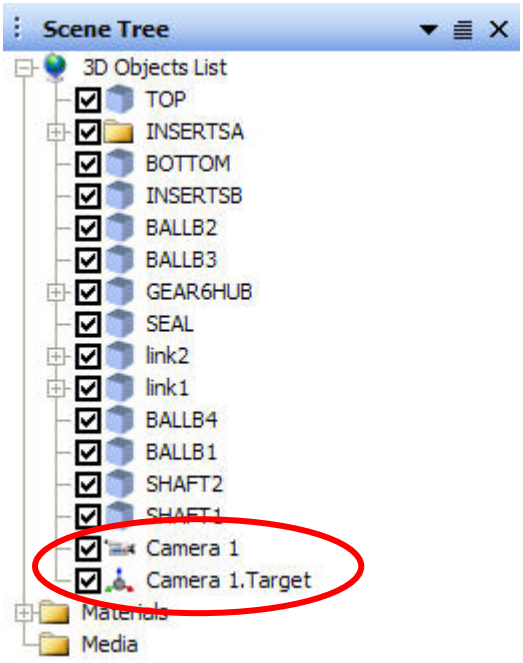


Note: Choosing Target Camera will ensure that the camera is always looking (pointing) at the same point on the model. Tutorial #2 will focus on changing the target camera path.

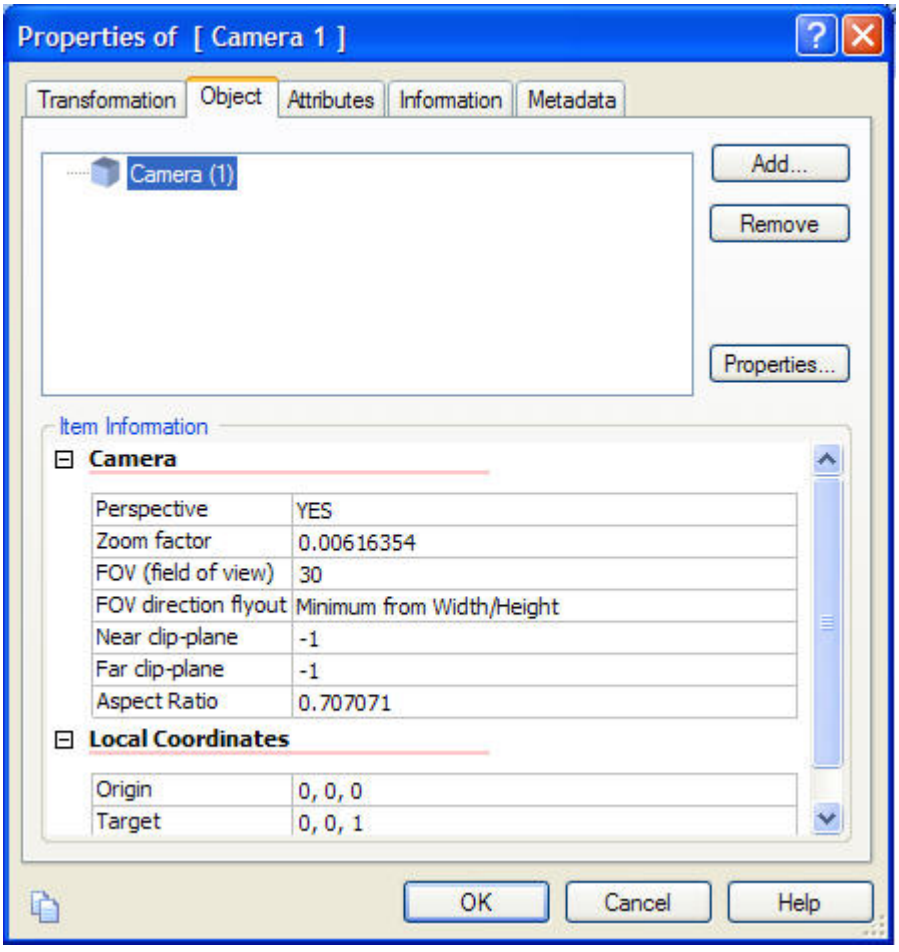
Tip: Ensure that **Show Cameras and Lights** is activated from the **Display** menu.

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4 The objects **Camera** and **Camera Target** will be added and displayed in the Scene Tree panel.



5 Right click the **Camera 1** object and select **Object Properties**.



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Setting the Perspective to Yes, will display the scene in perspective mode, otherwise the scene will be displayed orthographically.

For any viewport there are two field of views (FOVs) in effect; horizontal and vertical. For simplicity, you only need to specify one of these, and the other one is calculated based on the aspect ratio of the viewport. Note that it is only the ratio of width to height that is important; the actual size of the viewport is irrelevant. For example, if a camera is set to have a FOV of 30° applied horizontally, and the viewport is exactly square, the vertical FOV is also 30°.

By using the minimum from width/height value, the FOV is calculated and applied to either the viewport width or the height, whatever dimension is the lesser. Conversely, the maximum width/height value calculates and applies FOV to the viewport width or the height, whatever dimension is the greater. Therefore, if the 30° FOV is applied to the maximum from width/height, then 30° by 30° is the most that is ever seen of the scene.

If a scene is significantly longer in one direction than the other, and you want to capture the whole scene in one rendering, we recommend matching the FOV direction to the smallest dimension of the scene.

The clipping plane lets you exclude some of a scene's geometry to view or render only certain portions of the scene. Each camera has a near and a far clipping plane. Objects closer than the near clipping plane or further than the far clipping plane are invisible to the camera. Clipping planes are useful for rendering selected portions of a scene that have a lot of complex geometry. They can also help you create cutaway views. Clipping plane settings are part of the camera's creation parameters.

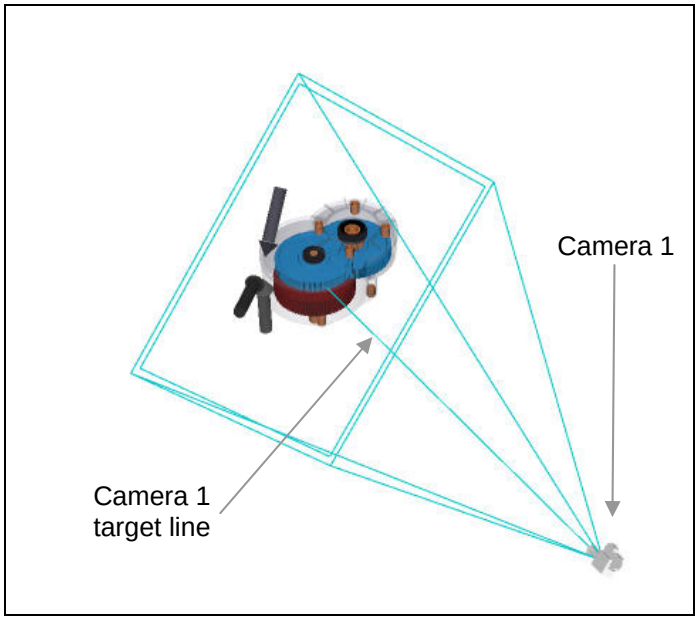
The location of each clipping plane is measured along the camera's line of sight (its local Z axis) in the current units for the scene.

By setting the distance between the camera and the camera clipping planes, you can select how far you can zoom in to and out from the model while still seeing the objects' details. For example, if you reduce the near clipping plane distance, you are able to zoom in much further to the model and see more detail. Conversely, if you reduce the far clipping plane distance, objects seem to disappear much more quickly as you zoom out from the model.

The aspect ration defines the relationship between the width and height of the scene and is mainly used for 'output size' rendering.

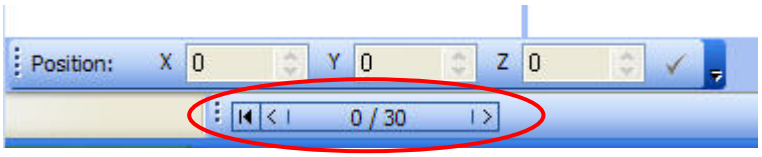
6 Reduce the **FOV (field of view)** to **20** degrees, set the **FOV direction flyout** to **Maximum from Width/Height** and the **Aspect Ratio** to **1**.

7 Leave all other settings as default. Zoom out, the camera will be displayed as follows:

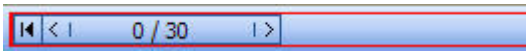


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8 From the menu bar select **View > Controls and Toolbars > Animation Controls**. The keyframe slider will be displayed at the bottom of the screen.

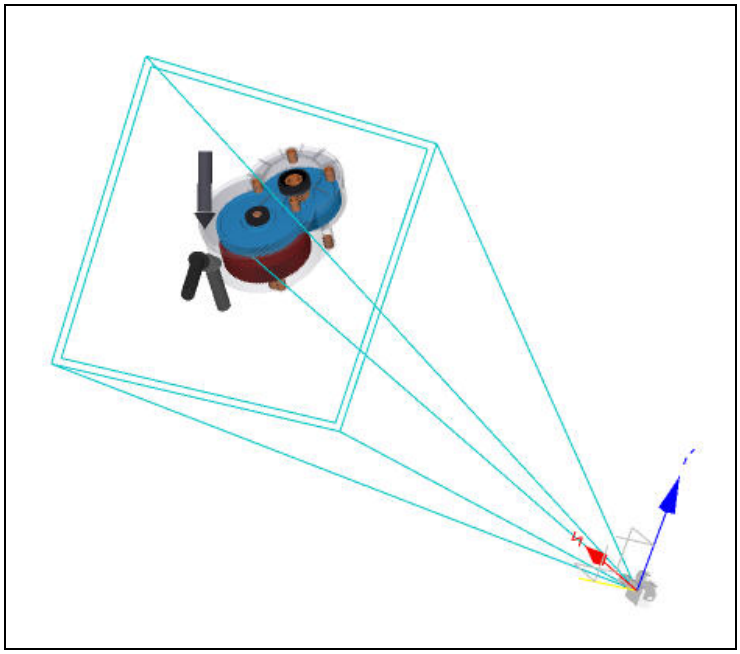


9 Select the **Edit Keyframes** icon, , from the **3D Editor** toolbar. The keyframe slider will now become active.



10 With the **Camera 1** object selected move the keyframe slider to frame **5**.

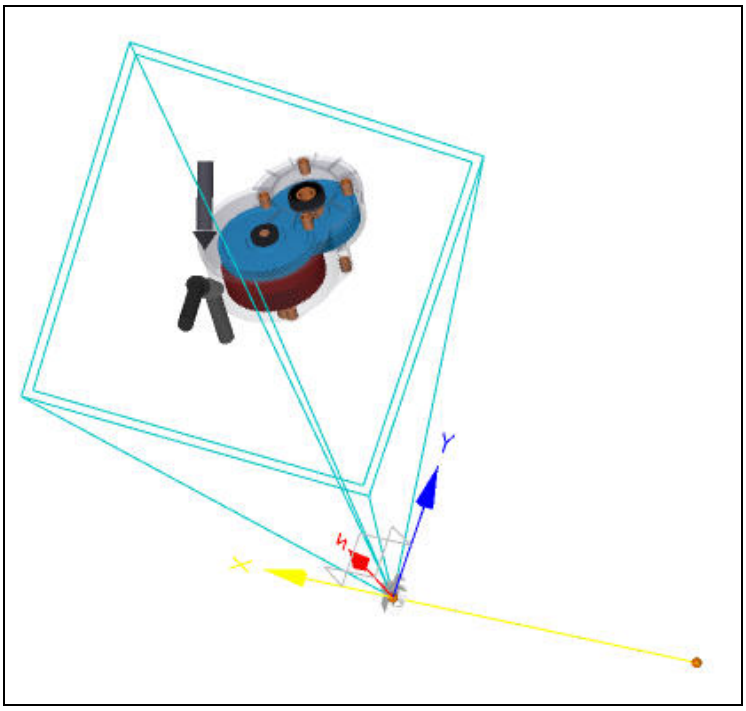
11 Select the **Move** icon, , from the **3D Editor** toolbar. The movement axes will be displayed on the camera object.



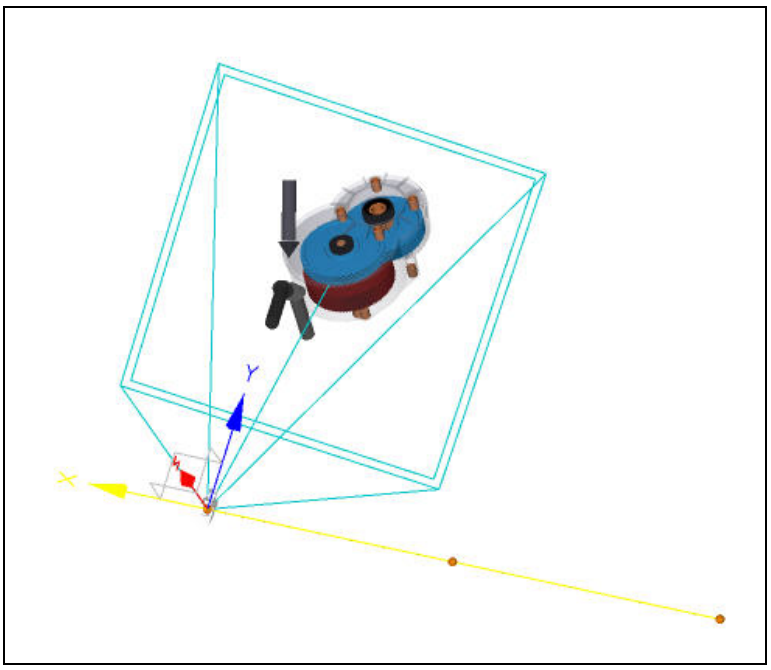
Note: If the movement axes are not displayed on the camera object, right click the Camera 1 object in the Scene Tree window and select **Tools > Move Pivot Point to Object Center**.

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12 Move the **X axis** (yellow) to the left. The camera path will be displayed.

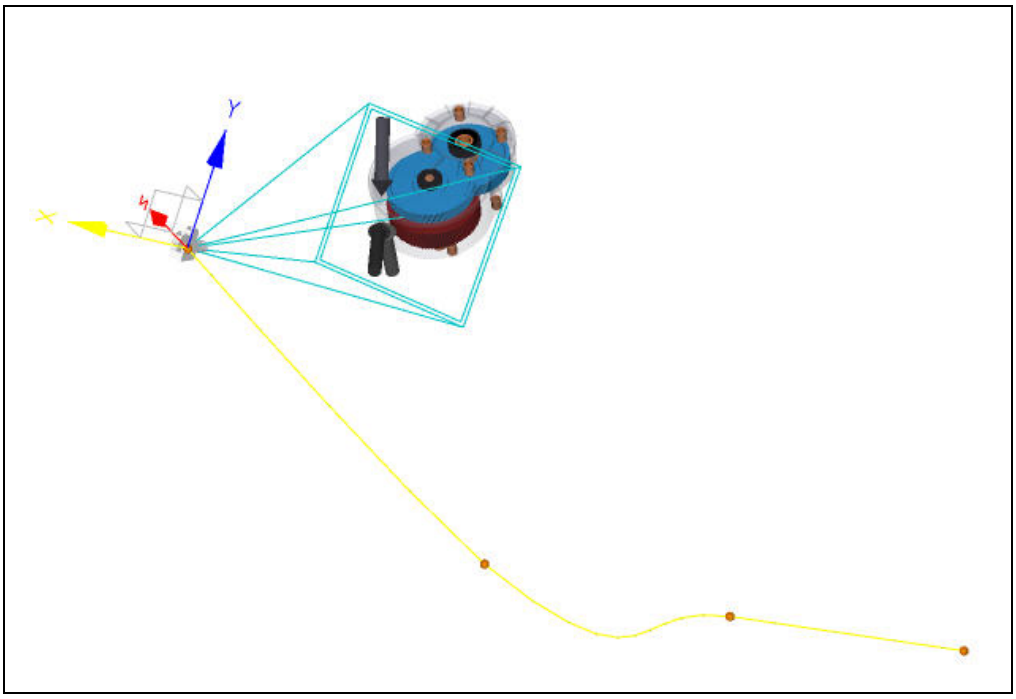


13 Move the keyframe slider to frame **15** and move the Camera 1 object further to the left. You will notice that at every Move point a small orange dot will be displayed.

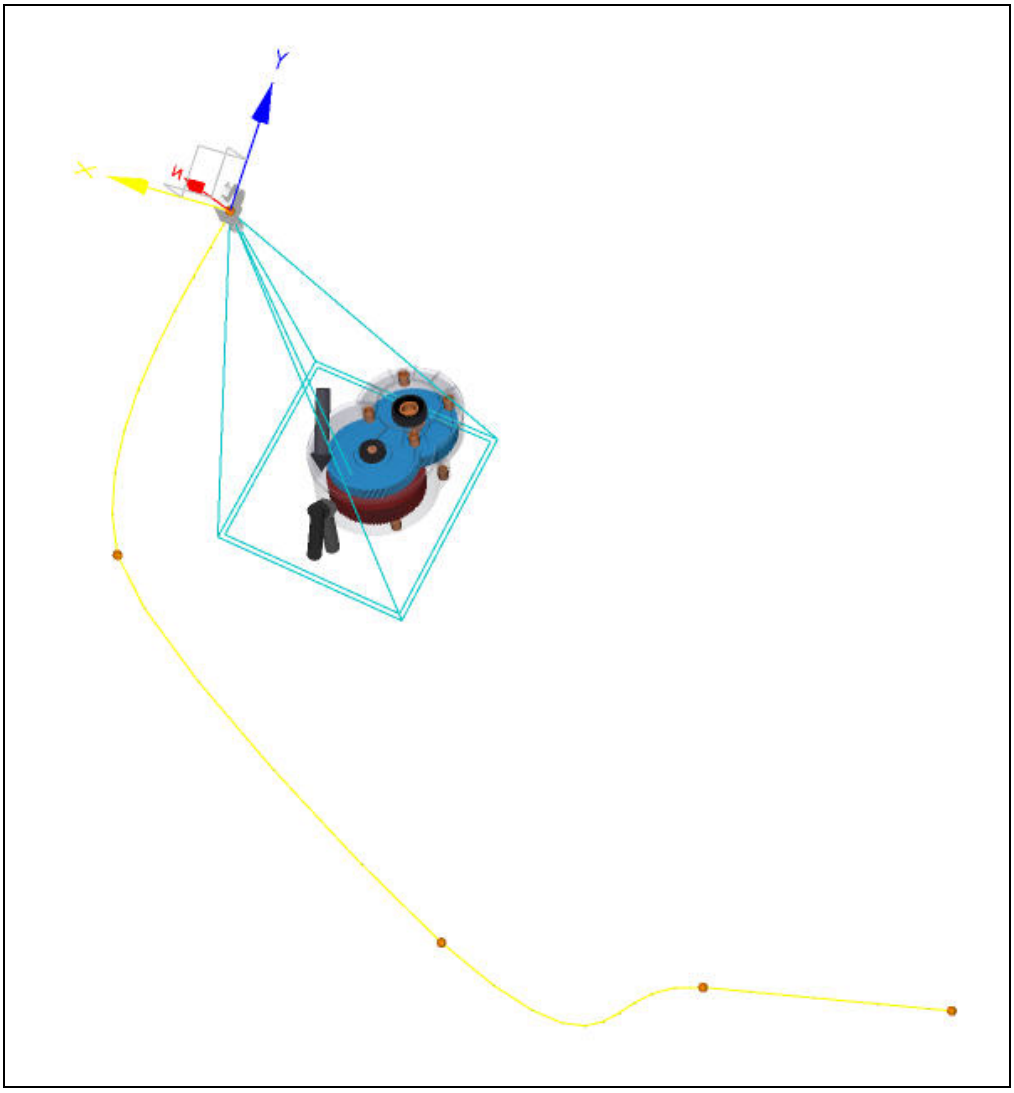


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14 Move the keyframe slider to frame **20** and move the Camera 1 object along the **Z axis** (red). Rotate the model so you can see the Z axis more clearly.



15 Finally, move the keyframe slider to the last frame, **30**, then move the Camera 1 object along the **Y axis** (blue).



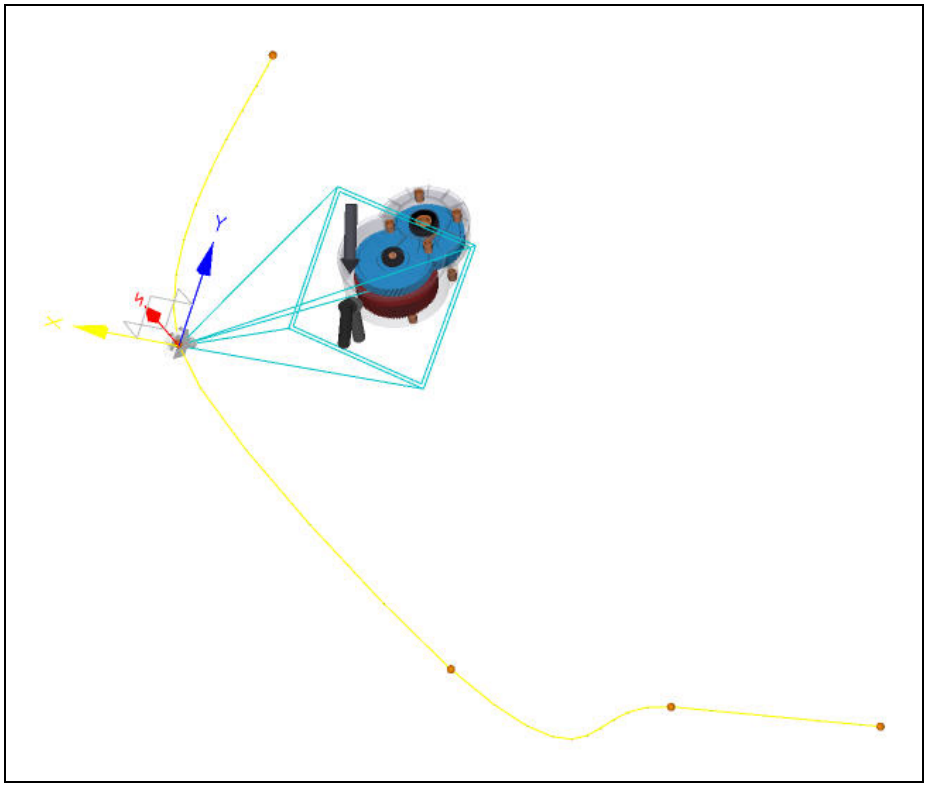
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16 You will see that the camera path is displayed along a **yellow** line with the movement points shown as **orange** dots. These movement points can be selected and changed using the keyframe slider and the Move tool.

To see the Camera 1 object move along its path:

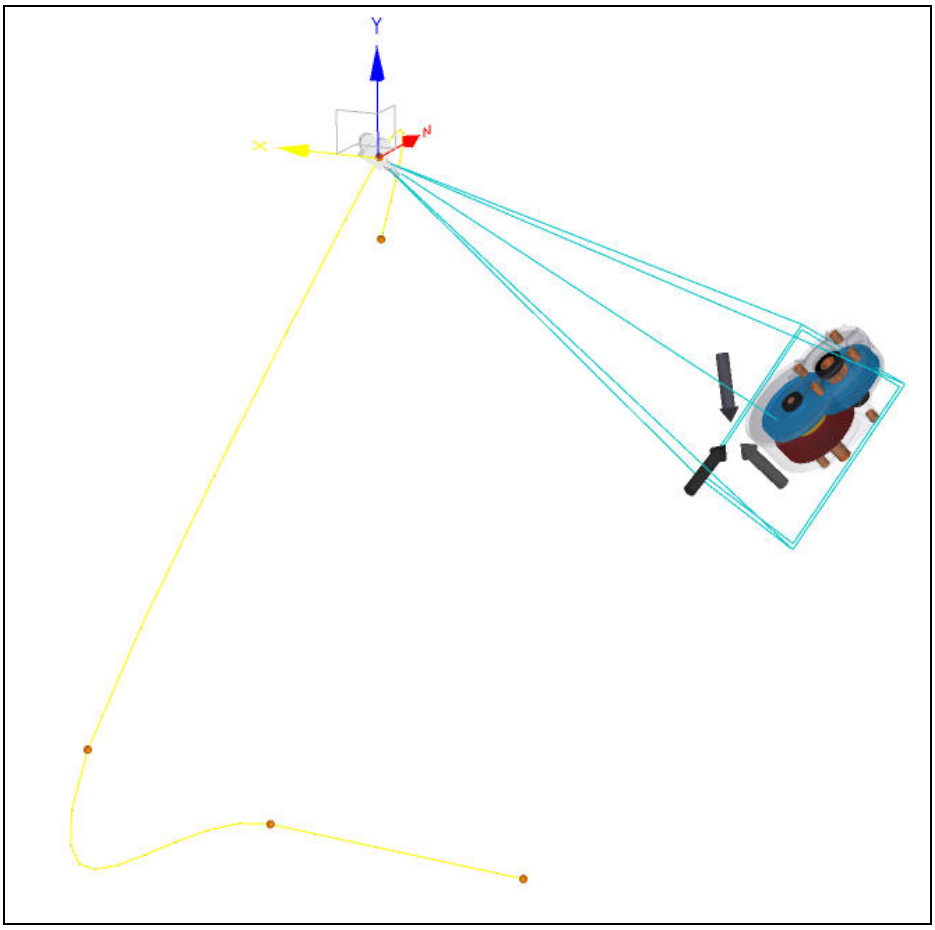
- ***Deselect the Edit Keyframes option***
- ***Deselect the Move icon***
- ***In the Viewport window move the cursor over the User item, right click and select Views > Camera 1. The View will change to the Camera 1 object.***
- ***Click the Play icon on the Animation Controls toolbar. The Camera 1 object will move along the path and the Viewport will display what the camera sees.***
- ***To see the camera path and views more clearly, slow down the animation by double clicking the keyframe slider and changing the Speed to 25%.***

17 With the **Camera 1** object, **Edit Keyframes** and **Move** option still selected move the keyframe slider back to frame **20**. You will notice that the Camera 1 object moves back along the camera path to the previous movement point (orange).



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18 Move the **Camera 1** object along the **Y axis** (blue), to alter the camera path. Rotate the model to get a clearer view of the path if necessary.



19 Change any of the other movement points as required and reselect the **Camera 1** view again, play the sequence and notice the difference.

Display the scene in two viewports (View > Viewports > 2 Views Side by Side), select the User viewport for one display and select the Camera view for the other. This can be useful to see the camera path (User) and also what the camera sees (Camera 1).

Congratulations, you have now setup and created a Camera object, camera target, changed the camera path and played the animated sequence.

To see advanced features, editing and changing the target camera path, refer to Tutorial #2.

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