755 Phoenix Drive, Ann Arbor MI, 48108, USA
Phone: 734 668-2930 • Fax: 734 668-2877 • Email: info@carsim.com
carsim.com

Animator: Camera Setup

VS Visualizer shows moving rigid objects, stationary objects, and internally animated objects such as walking pedestrians or windmills. Use this screen to define the location, aim, and field of view of a simulated video camera.

VS Visualizer supports multiple camera views, but only one that is set automatically (using datasets from this library).

In general, the picture seen by a camera can be defined by three elements:

1. the *location* of the camera,
2. the *direction* in which it is pointed, and
3. the *field of view*.

The Camera Setup screen provides two options for locating a camera: an external view (looking at the simulated vehicle) and an occupant view (looking at the world from inside the vehicle). VS Visualizer will initially show a single camera view.

You may also add new cameras within VS Visualizer interactively. Right-click within the VS Visualizer view to either *Select Cameraman* from available cameras or change *Camera properties* on the currently selected cameraman.

Alert	Most screens in the VS Browser are used to provide data to the VS Solver that performs the vehicle simulation. Parameters for a VS Solver can be specified with numbers or formulas. However, this screen is used to provide data to VS Visualizer. Formulas are not supported; all values must be numerical and must be based on the units shown on the screen.

External Camera

Figure 2 shows the **Animator: Camera Setup** screen with the options chosen to locate the camera external to the vehicle. This is option is typically used to visualize simulations that do not involve a driving simulator.

(1) Point(s) of view drop-down list (Figure 1). This is used to choose between options for locating one or two cameras.

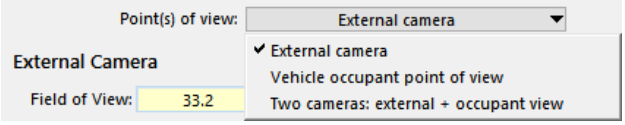

Figure 1. Camera point-of-view options.

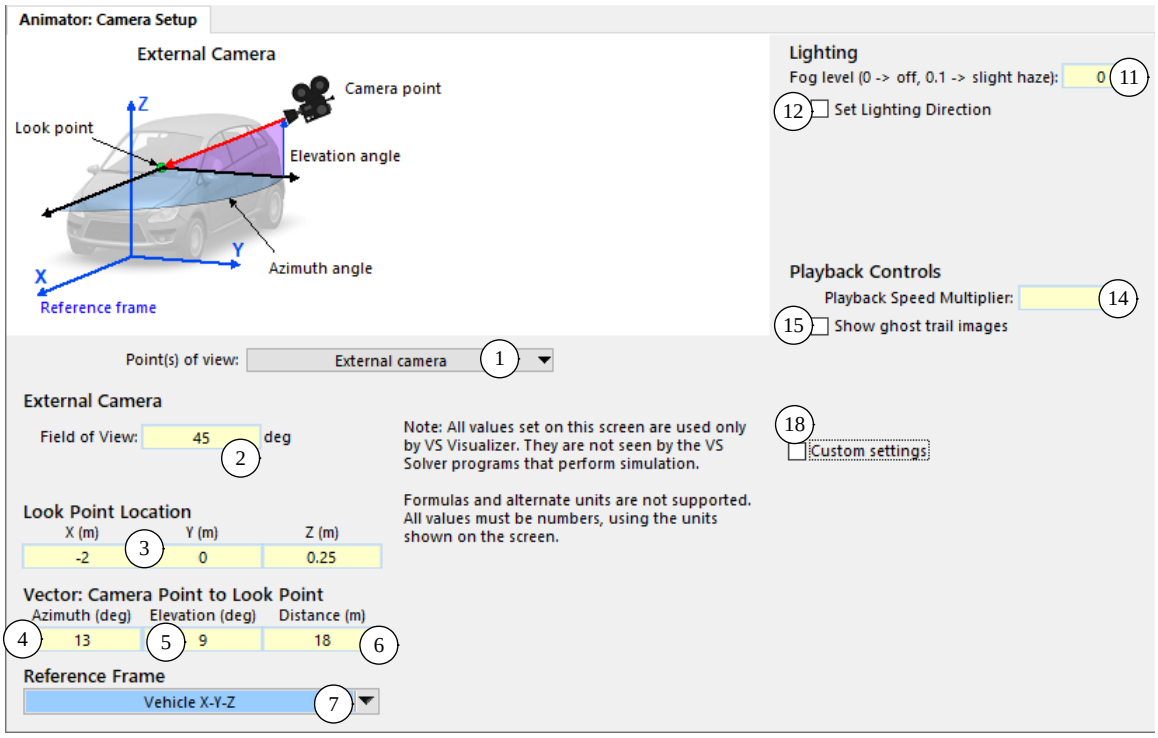

Figure 2. Animator: Camera Setup screen set for an external camera.

Each option hides or reveals data fields on the screen for entering or linking the data required to define the camera view.

The first option locates the camera external to the vehicle. In this case, shown in Figure 2, the direction in which the camera is aimed is defined with a Look Point specified by coordinates (3) in a Reference Frame (7), and a vector defined with two angles ((4) and (5)) and a distance (6) that locates the Camera Point relative to the Look Point.

(2) Camera field of view (keyword = `SET_FIELD_OF_VIEW`). The field of view is the angle that determines how much of the simulated world in front of the camera is visible. A small angle is equivalent to "zooming in" with a telephoto lens; a wide angle is equivalent to "zooming out." This field is visible only when there is an external camera specified in the drop-down list (1).

(3) X, Y, and Z coordinates of the Look Point in the specified Reference Frame (7) (keywords = `SET_LOOKPOINT_X, SET_LOOKPOINT_Y, SET_LOOKPOINT_Z`). These fields are visible only when there is an external camera specified in the drop-down list (1).

(4) Azimuth angle of camera relative to look point (keyword = `SET_AZIMUTH`). When viewed from above, this is the angle (counter-clockwise) from the X-axis of the camera Reference Frame to a line connecting the Look Point to the camera. This field is visible only when there is an external camera specified in the drop-down list (1).

(5) Elevation angle of camera relative to the Look Point (keyword = `SET_ELEVATION`). When viewed from the side, this is the angle up from a horizontal plane to a line connecting the look point to the camera. Specify a negative elevation angle if you want to position the camera

below the look point. This field is visible only when there is an external camera specified in the drop-down list (1).

(6) Distance from the camera to the Look Point (keyword = SET_DISTANCE). This field is visible only when there is an external camera specified in the drop-down list (1).

(7) Link to a dataset specifying the Reference Frame in which the Look Point and camera are located. The Reference Frame can be fixed or moving. This link is visible only when there is an external camera specified in the drop-down list (1).

> **Note** The documentation for the screen **Animator: Reference Frame** describes how you define reference frames.

Occupant View

Figure 3 shows the **Animator: Camera Setup** screen with the option chosen to locate the camera in the vehicle to provide the view seen by an occupant. This option is typically used in driving simulators.

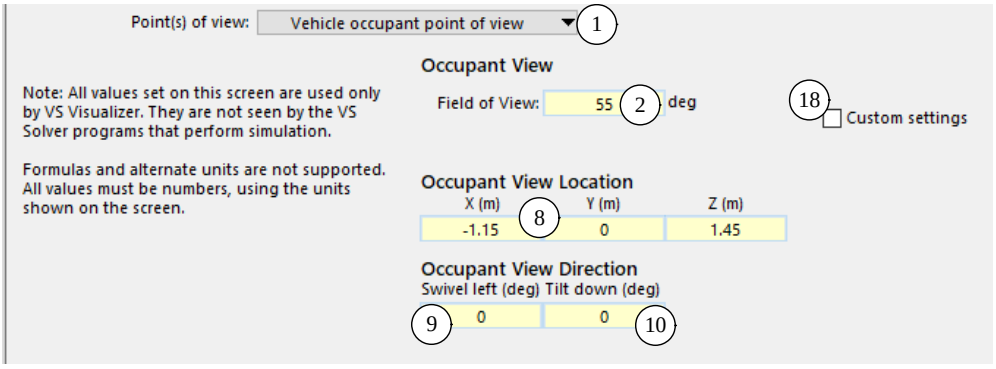

Figure 3. Animator: Camera Setup screen set for an occupant view.

In this case, the Reference Frame is automatically set to that of the sprung mass of the vehicle. New control items are shown to specify the location of the occupant point of view.

(8) X, Y, and Z coordinates of the occupant view location in the coordinates of the vehicle sprung mass (keywords = SET_OCCUPANT_X, SET_OCCUPANT_Y, SET_OCCUPANT_Z). These fields are visible only when there is an occupant view selected from the drop-down list (1).

(9) Swivel angle (horizontal, left is positive) of occupant view (keyword = SET_SWIVEL). This field is visible only when there is an occupant view selected from the drop-down list (1).

(10) Tilt angle (vertical, down is positive) of occupant view (keyword = SET_TILT). This field is visible only when there is an occupant view selected from the drop-down list (1).

Lighting

> **Note** The lighting controls that can be set here are provided mainly to support older datasets that have been imported into newer versions. The recommended practice is to attach a "sky box" shape (an **Animator Shape File Link** dataset) to each scenario, typically from a **Road 3D Surface (All Properties)** dataset. The lighting is set in the Shape File dataset to match the lighting of the sky and far-away views. For more information a out this, please see the **Help** menu item **Animator>Shapes and Groups**.

(11) Scale factor to control fog effects (keyword = `FOG_SCALE`). Higher values cause objects at a distance to appear fogged, simulating atmospheric haze. In general, a small amount of fog (e.g., 0.1) can make an animation appear more real, as there is always some haze present in the atmosphere. However, higher levels cause visible artifacts in most examples installed with VS products.

> **Note** The default force scale in VS Visualizer versions prior to 2019.1 was 1.0; this was changed to 0 in 2019.1.

(12) Checking this box enables the location of the animator light source to be set (13). As noted above, nearly all examples provided in current versions of VS products have this box unchecked.

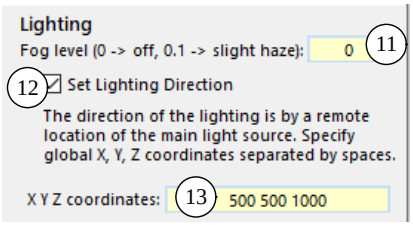

Figure 4. Optional lighting direction.

(13) X, Y, and Z coordinates of the animator light source (keyword = `SUN_POSITION`). This field is only visible only when box (12) is checked. Unlike most fields for parameters, this one has three values that are separated by spaces. The default is `1000 1000 1000`.

Playback Speed

(14) If specified, this is the initial playback speed for animations (keyword = `SET_PLAYBACK_TIME_MULTIPLIER`). The default is 1 (real time). Regardless of the setting here, the playback speed can always be adjusted interactively in VS Visualizer.

This field is provided in case there is a simulation scenario that is routinely viewed with a nonzero multiplier (e.g., faster animations for very long simulations) to avoid the time and effort needed to set the multiplier interactively.

Ghost Images

VS Visualizer can display up to 1000 additional images of all shapes (“ghosts”) as they appeared in the past. This effect is to leave a trail of where the vehicle has traveled recently (Figure 5). The effect is helpful in preparing static images for presentations (papers, posters, etc.).

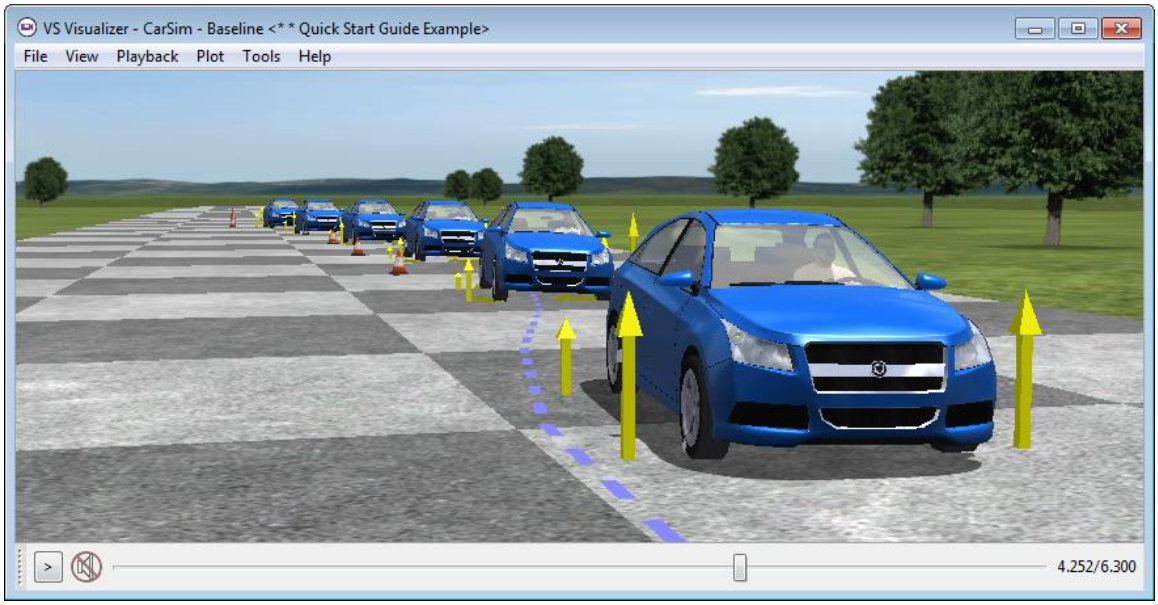

Figure 5. Video with ghost images.

Figure 6 shows the controls used to specify ghost images.

(15) Checking this box enables ghosts to be specified.

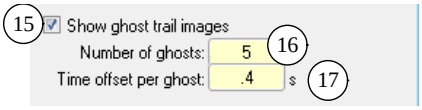

Figure 6. Settings used to generate ghost images shown in Figure 5.

(16) Number of ghosts (keyword = `GHOST_COUNT`). A small number of ghosts (< 20) is usually sufficient to create a still image that documents past motion. Large numbers of ghosts can tremendously increase the animator workload and slow down the display. The display of images like tire tracks and skid marks use the ghost capability of the animator, so when these features are selected, ghosting of the vehicle is turned off.

(17) Time offset per ghost (keyword = `GHOST_PERIOD`). This is the time interval between ghost images. It is only used if the number of ghosts is greater than zero. The animator uses a negative number, but the value put in this field can be positive or negative. (The value sent to the animator is always negative.)

Custom Features

VS Visualizer includes many capabilities that are not yet supported directly by the GUI. Further, advanced users sometimes want to associate animation-related information to camera datasets. Therefore, this screen has controls with no predefined purpose (Figure 7), that allow advanced users to add miscellaneous information to a camera dataset.

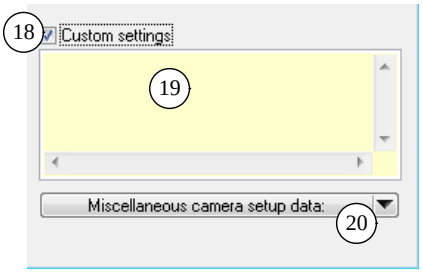

Figure 7. Options for advanced users to add miscellaneous information.

18 Checkbox to show more controls for custom settings. When checked, a yellow field 19 and miscellaneous link 20 are displayed.

19 Miscellaneous yellow field. This has no predefined purpose, but is available for advanced users to insert VS Commands or VS Visualizer settings using their keywords. It is not visible unless the Custom settings box 18 is checked.

20 Miscellaneous link. This has no predefined purpose, but can be linked to a dataset that specify parameters for extensions to the model or information for the animator. It is not visible unless the Custom settings box 18 is checked.