

Workflow MS 21 - Using AutoTurn

This document guides you through the use of the AutoTrack software. AutoTrack is used to determine the space required to maneuver vehicles.

Workflow Outline

Opening AutoTurn - AutoTurn runs within MicroStation. Once MicroStation is running, AutoTurn can be launched.

- ◆ **Commands Used: CDOT Menu > Tools >AutoTURN** - Used to launch the AutoTURN program.

Setting up AutoTURN - Before a path can be laid out, there are a number of settings that should be made.

- ◆ **Selecting a Vehicle** - The first step in defining a vehicle path is selecting the vehicle to be used.
 - **Commands Used: Vehicles icon** - Used to open the Select Current Vehicle dialog box.
 - **Group Vehicles by** - Used to arrange the vehicles in the list.
 - **Select Vehicle** - Used to identify the vehicle to be used.
- ◆ **Drawing Settings** - These control things like units of measure and steering angles.
 - **Commands Used: Program Settings** - Used to launch the AutoTURN program.

Creating a Path - This is what the vehicle will follow to generate the turning data. There are a number of methods available for creating a path.

- ◆ **Generate Arc Path, Generate Corner Path, and Generate Oversteer Corner Path** - Each of these methods uses input into Smartpath Tools dialog box and user defined start and stop locations to define the vehicle path.
 - **Commands Used: Generate Arc Path** - Use to follow a bend in the road.
 - **Generate Corner Path** - Used when turning a corner from one road to another.
 - **Generate Oversteer Corner Path** - Used when large vehicles are turning a corner from one road to another.
- ◆ **Steer a Path** - This option tracks the cursor's motion to define the vehicle's path.
 - **Commands Used: Steer a Path** - Use to create an interactive path.

Modifying a Path - Once a path has been completed, modifications to that path can be made with a number of tools.

- ◆ **Commands Used: Restart Path** - Used to add additional segments to the path.
- ◆ **Delete Last Section** - Used to remove segments of the path.
- ◆ **Path Control** - Used to modify an existing segment.

Creating a Path from MicroStation Graphics - With this option the vehicle's path is drawn in advance, using MicroStation drawing commands. These elements are then identified as an AutoTURN path.

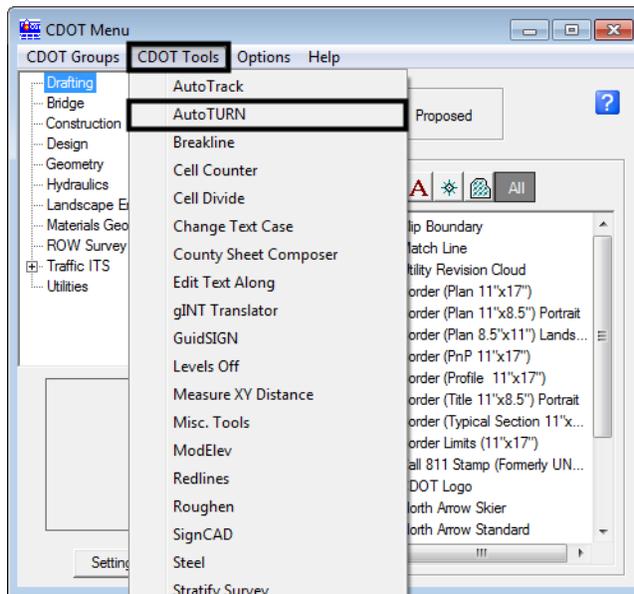
- ◆ **Commands Used: Select Active Path** - Used to identify the MicroStation elements to be used for the path.
- ◆ **Place Simulation** - Used to place a vehicle on the path.
- ◆ **Place Offset Simulation** - Used to create a parallel path offset to the left or right of the MicroStation elements.

Placing and Deleting Vehicles - Vehicle cells can be placed on the path without creating all of the envelope data. This can be used to check clearances at critical locations for example. Vehicle cells placed in this manner can also be deleted.

- ◆ Commands Used: **Select Active Path** - Used to identify the path
- ◆ **Place Vehicle** - Used to put a vehicle cell on a path.
- ◆ **Delete Vehicle** - Used to remove a vehicle cell from the path.

Opening AutoTURN

1. From the CDOT Menu, select **CDOT Tools > AutoTURN**.



2. The **AutoTURN** toolbar will also displayed along with the **Welcome to AutoTURN** wizard.



Setting Up AutoTURN

There are a number of settings that control the behavior of AutoTURN. These settings include: vehicle type, drawing units, display options, and vehicle defaults.

Selecting a Vehicle

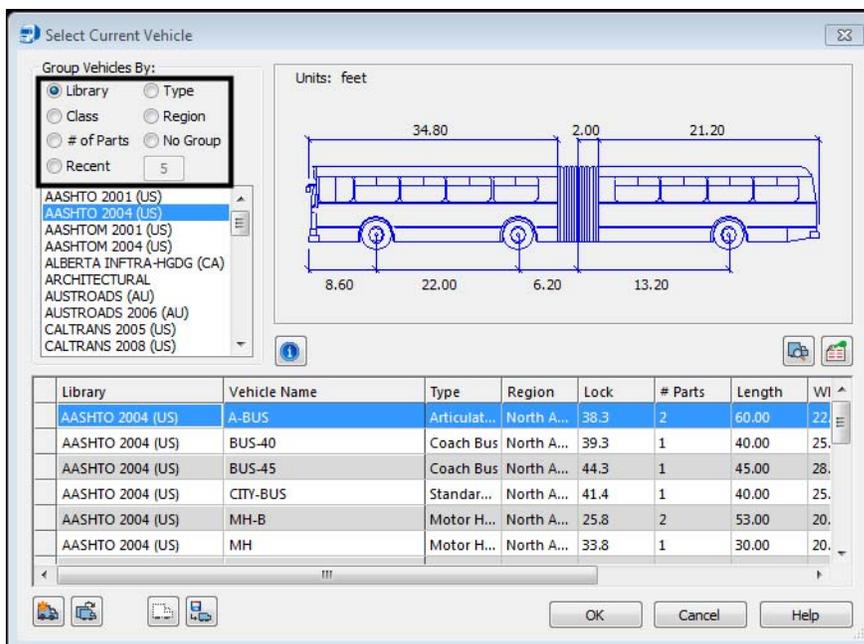
1. <D> the **Vehicles** button from the toolbar or the wizard to display the **Select Current Vehicle** dialog box.



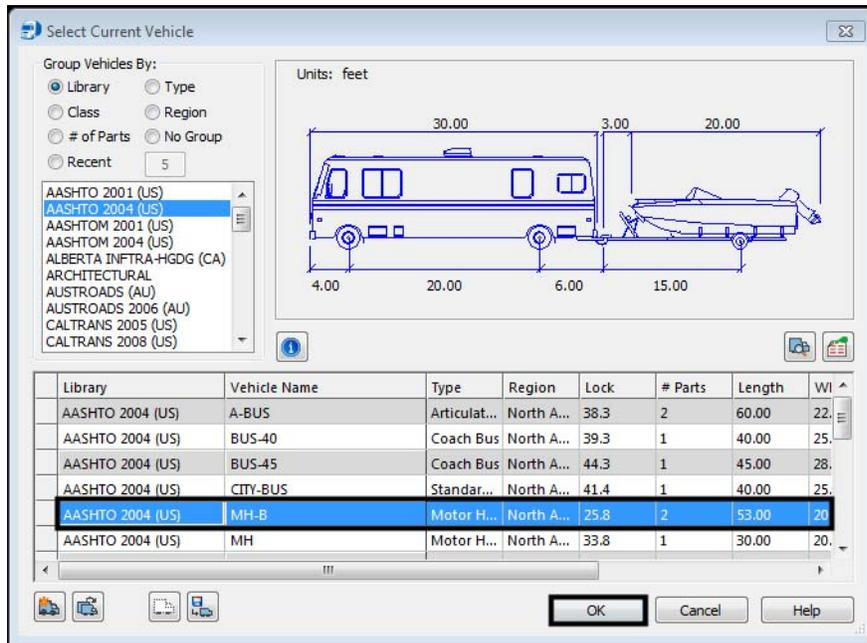
The vehicles in the library can be sorted by **Library**, **Class**, **number of parts**, **Recent selections**, **Style**, **Region**, or **No Group**.

Note: All options except Library show vehicles from all of the other libraries.

2. <D> one of the seven buttons to choose a sorting method.



- To select a vehicle, highlight the name from the list box at the bottom, and <D> **OK**. The **Select Current Vehicle** dialog box will be dismissed.



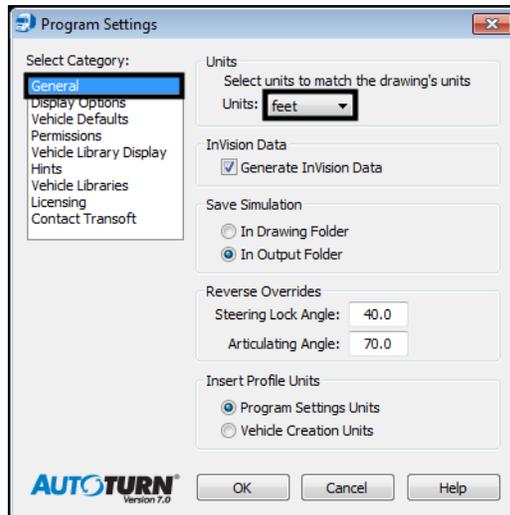
Drawing Settings

The remaining settings mentioned above are controlled through the **Program Settings** dialog box.

- <D> the **AutoTURN Program Settings** button from the toolbar to display the **Program Settings** dialog box.



2. Select the **General** category to set the **Units**. This should be set to the **Master Units** used in the MicroStation dgn file. **Feet** is equivalent to **Survey Feet** for this purpose.



Creating a Path

Once the desired settings have been made, a path can be created for the vehicle to use. There are five commands that are used to create a path: Generate Arc Path, Generate Corner Path, Oversteer Corner Path, Steer a Path, and Place Offset Simulation.

Creating a Path with Generate Arc Path, Generate Corner Path, or Oversteer Corner Path

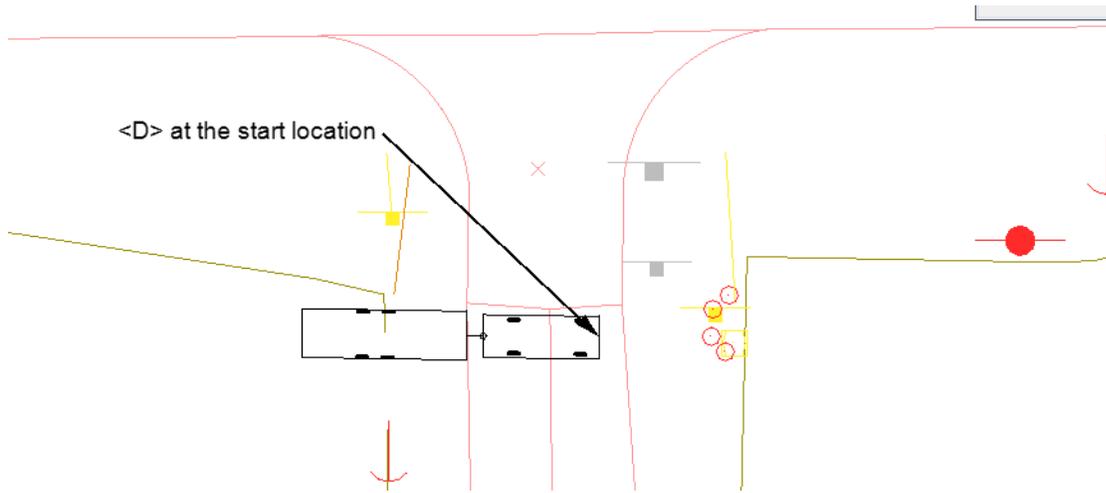
1. Zoom in on the area where the path is to begin.
2. Select one of the three **Generate Path** icons.



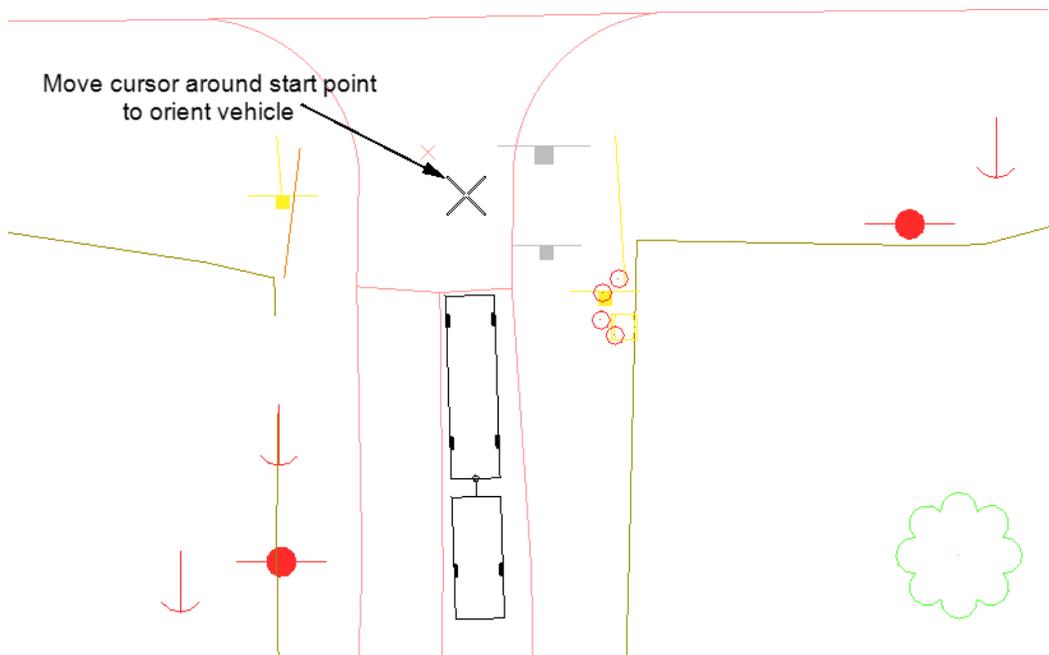
A cell of the vehicle is attached to the cursor.

Note: If you cannot see the vehicle, left click twice in the view in the area where you would like to place the vehicle. This will place the vehicle. Do a Fit View this will make the vehicle visible. Zoom in on the vehicle, delete the cell, and reinitiate the command.

3. Move the cursor to the desired start point and <D> to identify the vehicle's starting location.



4. The vehicle cell will pivot around the selected location. Rotate the cell to the desired orientation and <D>.

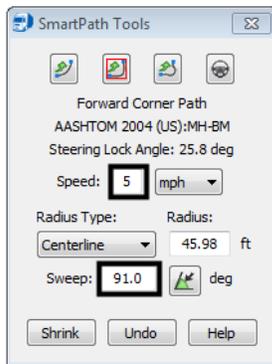


5. If desired, the **SmartPath Tools** dialog box can be used to set the angle. To use this option, key in the desired angle in the **Vehicle Starting Angle** field, then <D> the **Apply** button. Be aware that the angle is based on the MicroStation compass, with 0.00 facing right.

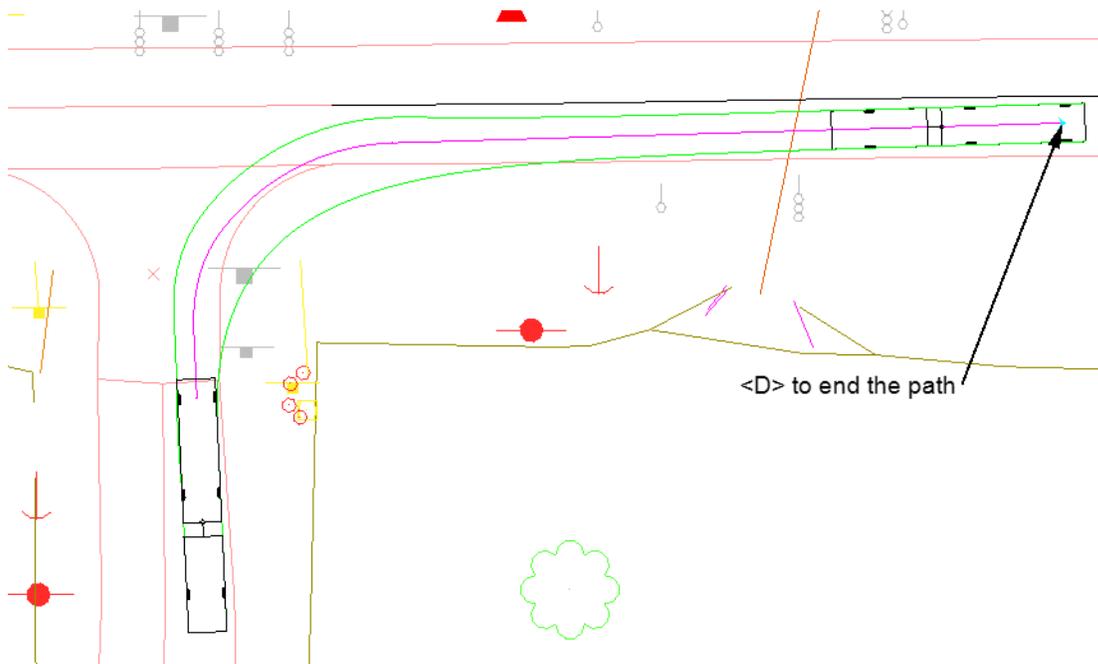


Once the starting angle is defined, the first leg of the path can be defined.

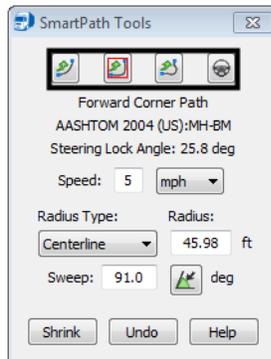
6. Set the desired **Speed** in the **SmartPath Tools** dialog box.
7. Set the **Sweep** in the **SmartPath Tools** dialog box.



8. To identify the end of the first leg <D> at the desired location.



- If additional legs for the vehicle path are required, the type of path is selected from the SmartPath Tools dialog box. The second leg is extended from the end of the first.



- <R> to end the Path.

Creating a Path with Steer a Path

The Steer a Path command tracks the cursor location to define the vehicle path. To create a path using this option:

- Zoom in on the area where the path is to begin.
- Select the **Steer a Path** icon.



A cell of the vehicle is attached to the cursor.

- Move the cursor to the desired start point and <D> to identify the vehicle's starting location.
- The vehicle cell will pivot around the selected location. Rotate the cell to the desired orientation and <D>. If desired, the **SmartPath Tools** dialog box can be used to set the angle. To use this option, key in the desired angle in the **Vehicle Starting Angle** field, then <D> the **Apply** button. Be aware that the angle is based on the MicroStation compass, with 0.00 facing right.
- Move the cursor along the desired path and the vehicle will follow.

Note: The vehicle moves toward the location of the cursor only while the cursor is in motion.

Note: It can be helpful to toggle off AccuSnap while using the Steer a Path command.
- <D> to stop the vehicle and display the vehicle envelope.
- <D> again to restart the vehicle along the path.
- To end the path, <D> then <R>.

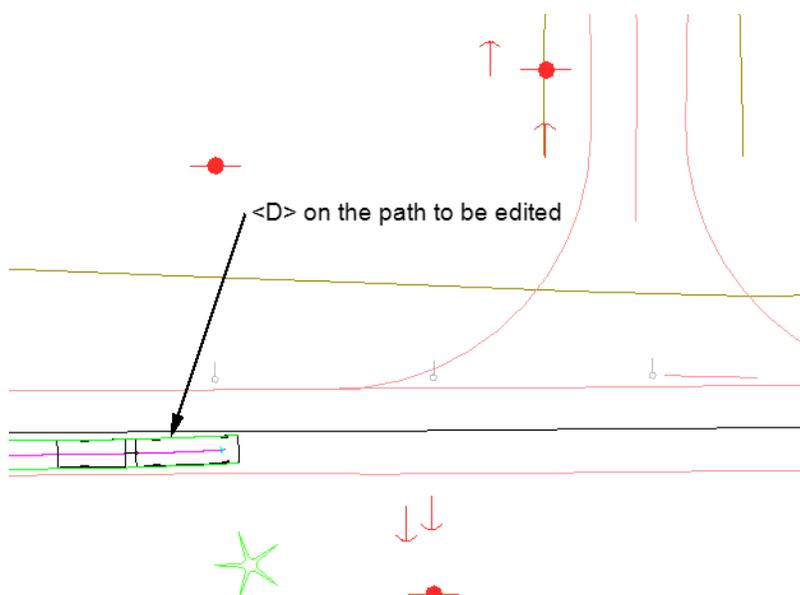
Restarting a Path

To add to a completed path:

1. <D> the **Continue Simulation** button on the **AutoTURN** toolbar.



2. <D> on the vehicle at the end of the desired path. The additional leg will use the last selected mode. A different mode can be selected from the **SmartPath** Tools dialog box. Additional legs are added in the same manner described above.



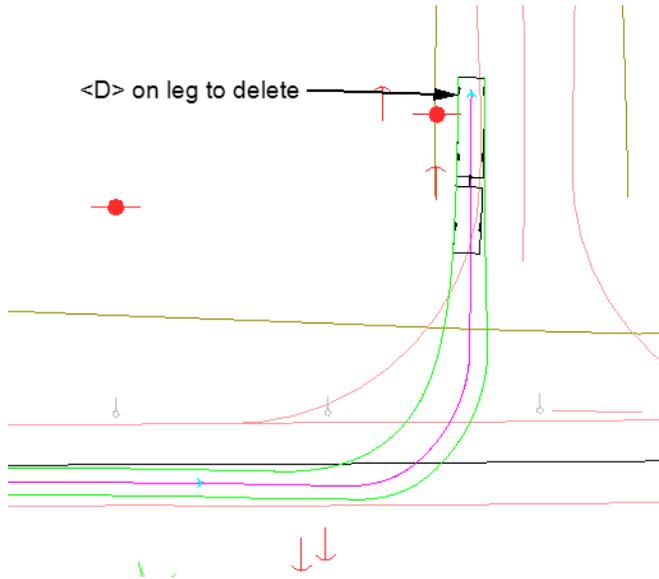
Deleting the Leg of a Path

To delete the last leg of a path:

1. <D> the **Delete Last Section** button on the **AutoTURN** toolbar.



2. <D> on the vehicle cell at the end of the desired path. The last leg of the path is removed.



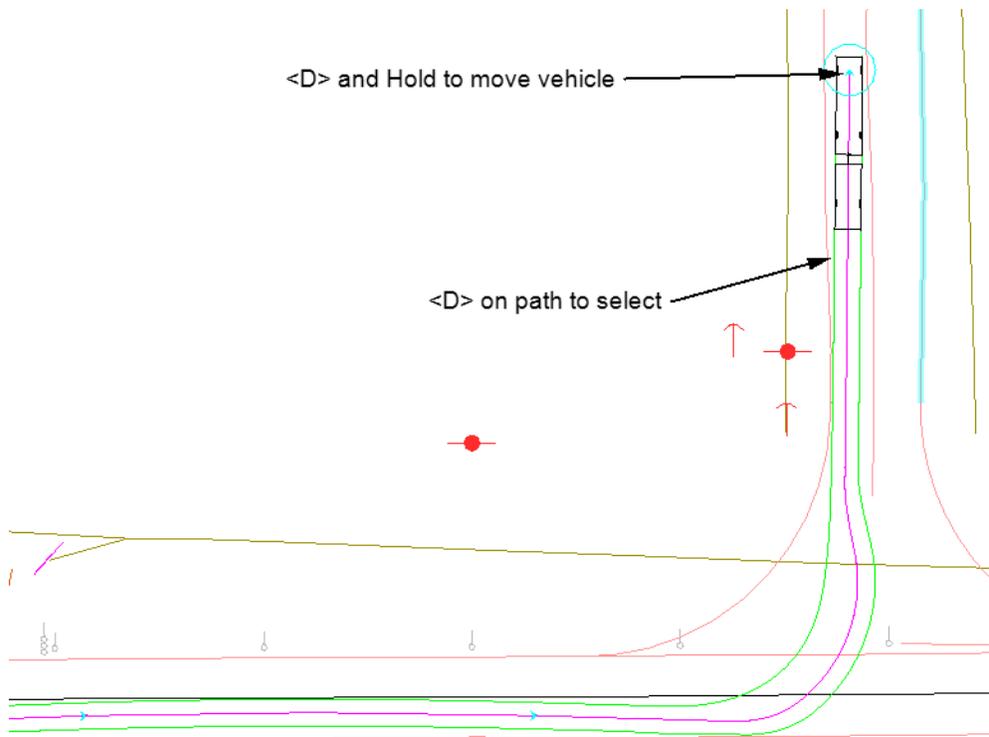
Modifying a Path

Minor changes can be made to Arc, Corner, and Oversteer Corner path legs. To make a change in one of these legs:

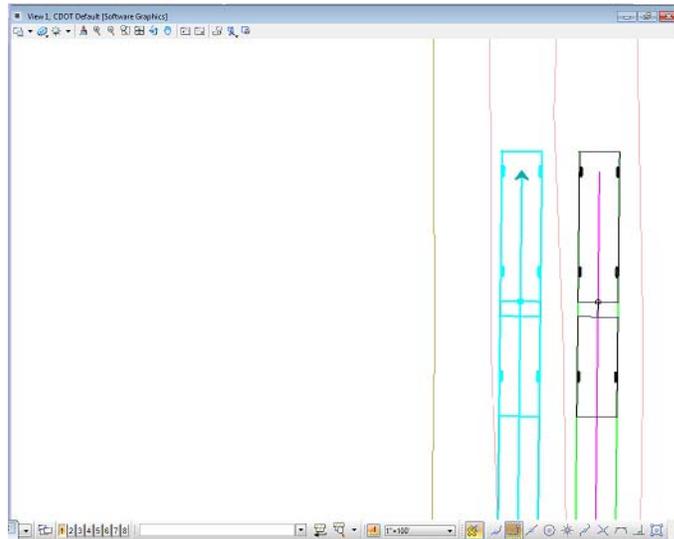
1. <D> the **Path Control** button on the **AutoTURN** toolbar.



2. **<D>** on an element that makes up the path to be edited. This can be the vehicle cell or one of the lines that make up the envelope.



3. **<D> and hold** on a circle in the path, then move the circle to the desired location.



4. Release the button in the desired location, then **<R>** to exit the command.

Creating A Path To Follow A Graphic Element

There are two methods of creating an AutoTURN path that follows a MicroStation graphic element or elements. One method identifies the element as an AutoTURN path then applies a vehicle to that path. The second method works similarly, but allows the user to apply an offset from the selected element.

1. Select the desired vehicle as described above.
2. <D> **Select Active Path** from the **AutoTURN** toolbar.



3. <D> on the element(s) that describe the path, then <D> to accept. The path is indicated with a circle at the beginning and an arrowhead at the end.

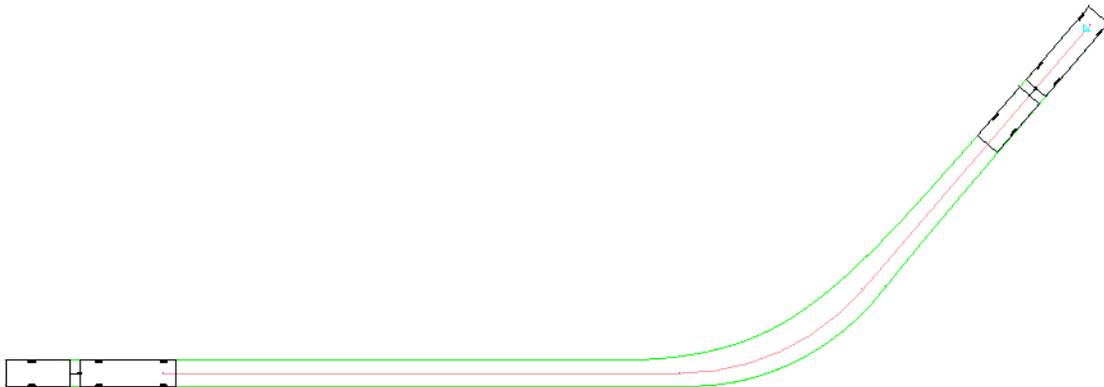


Note: If the element selected is a complex chain, <D> the element near the starting end for the path. If the path is a series of individual elements, identify the elements in order, from the beginning of the path.

4. <D> **Place Simulation** from the **AutoTURN** toolbar.



The vehicle and envelope are placed on the path.

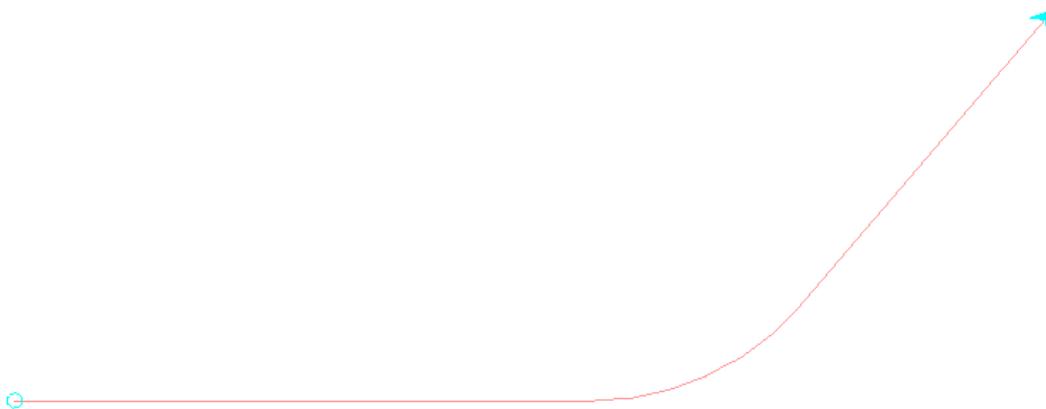


Place Offset Simulation

1. <D> **Place Offset Simulation** from the **AutoTURN** toolbar.



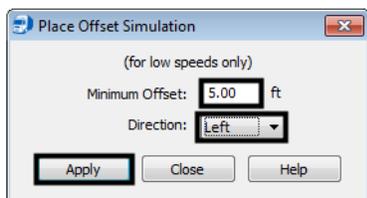
2. <D> the element(s) that describe the path, then <D> to accept. The path is indicated with a circle at the beginning and an arrowhead at the end.



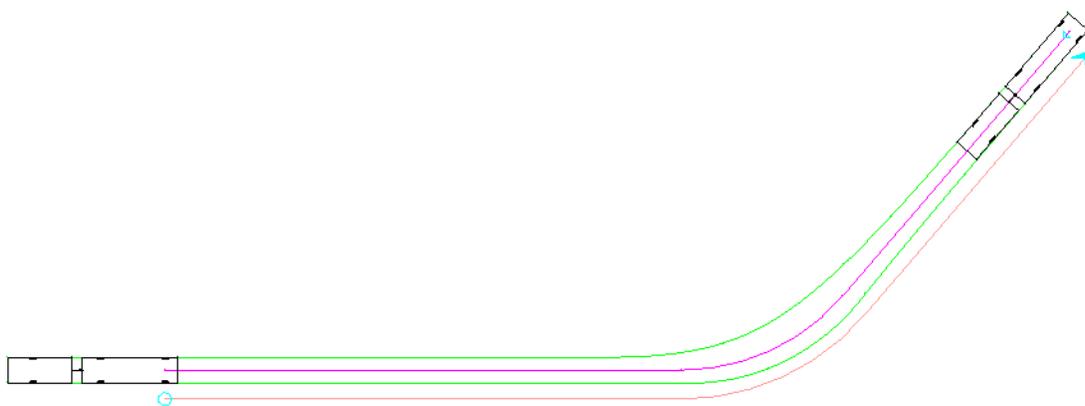
Note: If the element selected is a complex chain, <D> the element near the starting end for the path. If the path is a series of individual elements, identify the elements in order, from the beginning of the path.

3. The **Place Offset Simulation** dialog box is displayed. In the **Place Offset Simulation** dialog box, key in the desired offset value in the **Minimum Offsets** field. This is the distance from the path to the near edge of the envelope.

- Use the **Direction** drop down menu to identify which side of the path the offset is applied to.
- <D> the **Apply** button.



The vehicle and envelope are placed in the drawing.



Placing and Deleting Vehicles

Vehicles may be placed along a path without generating the envelope. Vehicles placed in this manner can also be deleted.

Place Vehicle

- Select the desired vehicle as described above.

Note: If there is an existing simulation on the desired path, the vehicle cell used in that simulation will be used by this command.

- <D> **Select Active Path** from the **AutoTURN** toolbar.

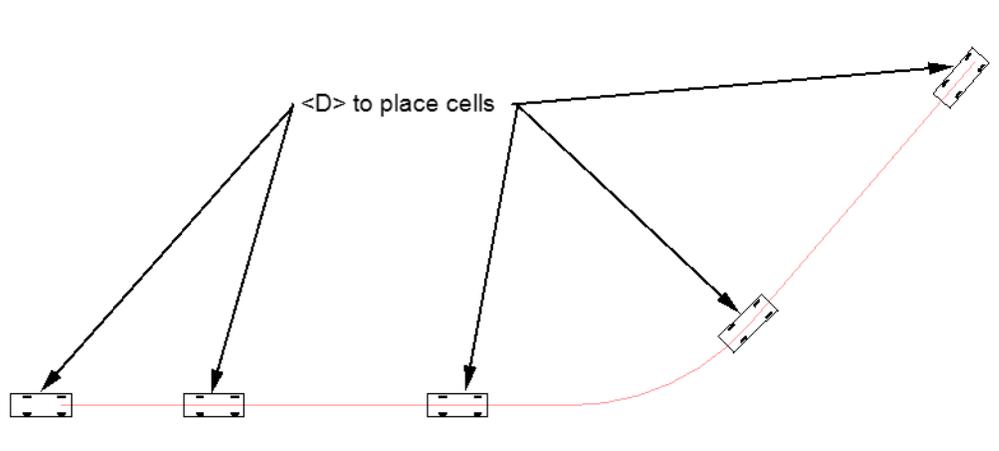


- <D> the element(s) that describe the path. The <D> to accept.

4. <D> **Place Vehicle** from the **AutoTURN** toolbar.



5. The Vehicle cell is shown on the path. The cell is moved along the path by moving the mouse.
6. <D> in the desired location to permanently place the cell in that location. Additional vehicle cells can be placed in this manner.
7. <R> to exit the command.



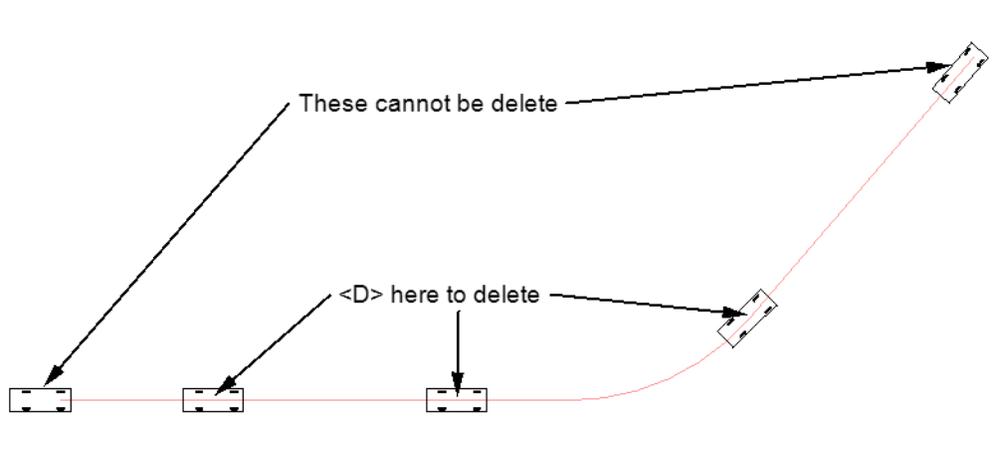
Delete Vehicle

Vehicle cells displayed using the Place Vehicle command can be removed from the path using the Delete Vehicle command.

1. <D> **Delete Vehicle** from the **AutoTURN** toolbar.



2. <D> inside the vehicle cell to be removed.



Note: Cells placed at the beginning, the end, or at a direction change (from forward to reverse, for example) cannot be deleted.