# Deriving Complex Composite Viewsheds

The Viewshed Analysis process in TNTmips products generates a viewshed for a specific viewpoint on an elevation raster, or a composite viewshed for multiple viewpoints. When you open the Viewshed Analysis process by selecting Raster/Elevation/Viewshed from the menubar, you are prompted to select an elevation raster. The Viewshed Analysis window opens along with a View window showing this elevation raster you selected and a default viewpoint at the center. The Viewshed Analysis window is used to add multiple viewpoints, change the viewshed parameters such as location and height of the viewpoint, and set the vertical/horizontal angles of view for the viewpoint added. Right-clicking on the View window when the Field-of-View icon is on or clicking on the Test button in the Viewshed Analysis window allows you to preview the Viewshed. Using this preview feature, you can test viewshed results with different parameters. Each time you make a change and right-click on the view window, or click on the Test button in the Viewshed Analysis window, the temporary viewshed is overlaid over the elevation raster in the view. When you are finished with testing, you can click on the Run button and save the viewshed as a new raster object.

Field-of-View icon
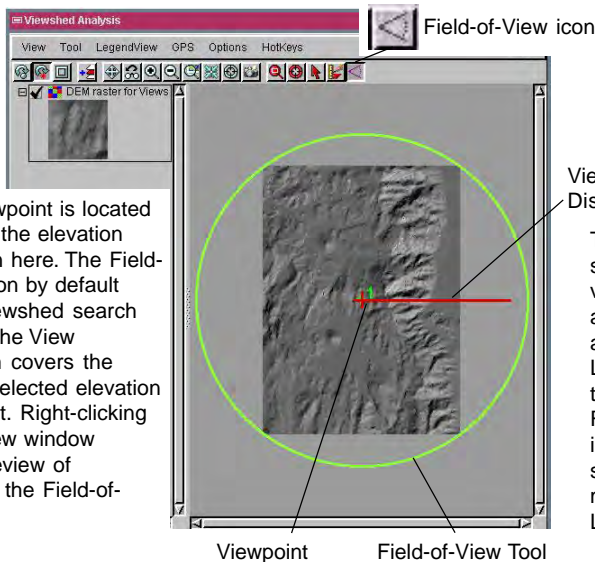
View Distance

The default viewpoint is located at the center of the elevation raster as shown here. The Field-of-View icon is on by default showing the viewshed search area based on the View Distance, which covers the extents of the selected elevation raster by default. Right-clicking anywhere in View window generates a preview of viewshed when the Field-of-View icon is on.
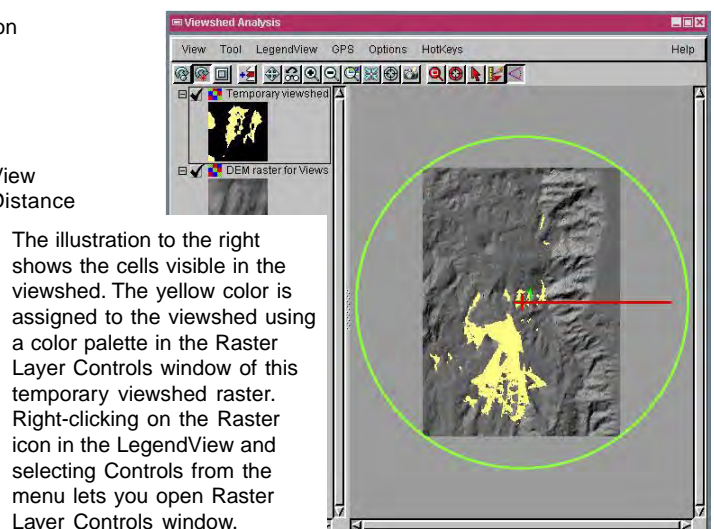
The illustration to the right shows the cells visible in the viewshed. The yellow color is assigned to the viewshed using a color palette in the Raster Layer Controls window of this temporary viewshed raster. Right-clicking on the Raster icon in the LegendView and selecting Controls from the menu lets you open Raster Layer Controls window.

Viewpoint   Field-of-View Tool

Location of the viewpoint on the elevation raster.

Z value for the viewpoint from the elevation raster.

Offset height of the viewpoint above the elevation surface.

Vertical angles of the upper and lower limbs of the field-of-view in the vertical plane measured from horizontal.

Bounding angles of the field-of-view in the horizontal plane. Start Angle is measured from the X-axis.

Number of the viewpoint.

Maximum radial search distance in the horizontal plane.

Click to delete the highlighted viewpoint.

Number	Line	Column	Z	Height	Down Angle	Up Angle	Start Angle	Sweep Angle	View Distance
1	307	225	2833.00	0.00	-90.00	90.00	0.00	360.00	380.62

The values in any field can be entered or changed by manually entering the desired values.

Click to add viewpoint.

Upper limb of the Field-of-View tool defined by Sweep Angle from Start Angle.

Number	Line	Column	Z	Height	Down Angle	Up Angle	Start Angle	Sweep Angle	View Distance
1	307	225	2833.00	0.00	-90.00	90.00	0.00	360.00	380.62
2	249	216	2691.00	0.00	-90.00	90.00	14.67	88.00	220.02

This illustration shows the second viewpoint added new viewshed parameters.

The composite viewshed for both viewpoints shown in table.

Sweep Angle is angle between the lower and upper limbs of the Field-of-View tool.

Z Scale   1.00   Percentage of Viewpoints   0.00
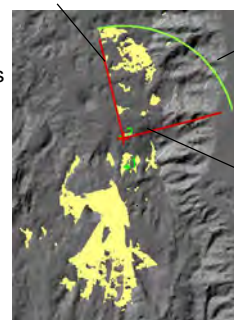
Test   Run...   Exit   Help

Use to convert the Height units of the viewpoint when the units of the elevation raster and the View Height are different.

Click to preview the viewshed.

Click on the Run button save the viewshed as a raster object.

Lower limb of the Field-of-View tool defined by Start Angle.

The Viewshed Analysis process lets you use mouse to reposition the active viewpoint and change the horizontal field-of-view in the View window. Any changes to the location of the viewpoint and to the horizontal field-of-view in the View window is reflected in the Viewshed Analysis window, and vice versa. You can also generate composite viewsheds for multiple points, save viewshed points as a vector object, and add more viewshed points from a previously saved geometric object (CAD or Vector). You can also specify the percentage for the minimum number of the viewpoints that the cell must be visible from to be included in the composite viewshed. The Percentage of Viewpoints setting in the Viewshed Analysis window is active only if there is more than 1 viewpoint specified. If you accept the default percentage, which is set to 0, any cell visible from at least 1 viewpoint is included in the composite watershed.

Use the right or left arrow cursor to click and drag on the radius lines to change the Start Angle and Sweep Angle.

Use the hand cursor to click and drag on the arc to change the View Distance.

Click to restore default values for the highlighted viewpoint.

Click to achieve more accurate results when analyzing an area larger in extent (tens of kilometers across or greater)

Use the four-point arrow cursor to click and drag within the wedge to reposition the viewpoint.

Active Point...
Inactive Points...

Click to run the Viewshed Analysis process.

Click to invert transparency to display the cells that can be visible from the selected viewpoints transparent.

Clicking on this icon opens the menu where you can edit the colors of active and inactive view points on the View window by using the Color editor.

Click to select another elevation raster.

The illustration above shows multiple viewpoints four of which are inactive viewpoints and one of which is the active viewpoint with its horizontal field of view. You can set horizontal field of view either by mouse in the View window or manually entering values in the Viewshed Analysis window. Note that any change on horizontal field of view are updated in the View and Viewshed Analysis windows.

Number	Line	Column	Z	Height	Down Angle	Up Angle	Start Angle	Sweep Angle	View Distance
1	207	225	2833.00	0.00	-90.00	90.00	0.00	360.00	112.28
2	173	141	2620.00	0.00	-90.00	90.00	0.00	360.00	114.59
3	396	157	1399.00	0.00	-90.00	90.00	0.00	360.00	90.12
4	282	281	3503.00	0.00	-90.00	90.00	0.00	360.00	208.03
5	131	318	2603.00	0.00	-90.00	90.00	89.83	122.00	111.44

Z Scale 1.00 Percentage of Viewpoints 50.00

Test Run...

Threshold percentage for the minimum number of the viewpoints that the cell must be visible from to be included in the composite viewshed. 50% means that composite viewshed is composed of the cells which are visible from at least 50% of the viewpoints.
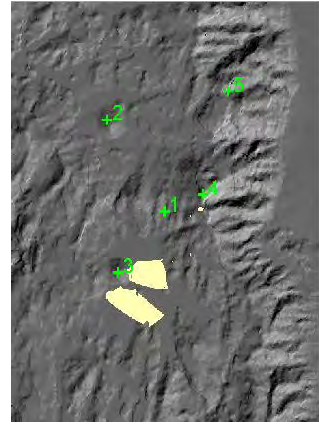
Opens the menu where you can choose to load or append viewpoints from a geometric object.
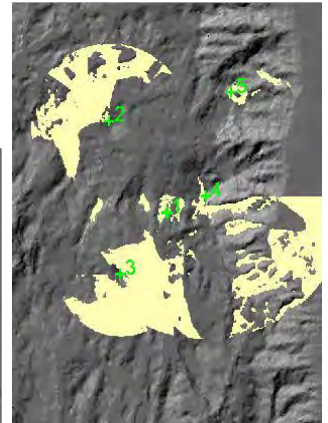
Load...
Append...

Saves the viewpoints as a vector object. When you reload or append this saved vector, the viewshed parameters are retained.
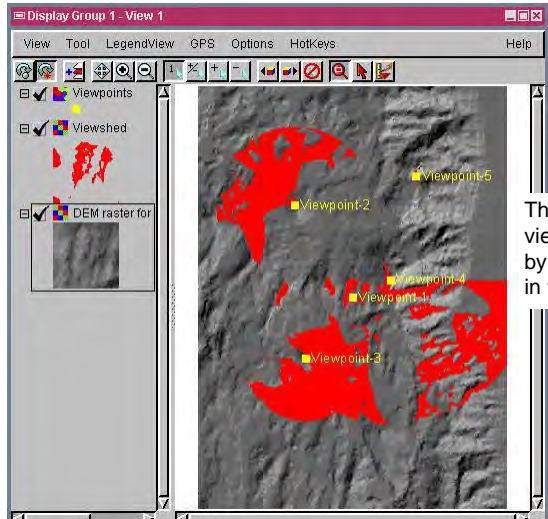
The composite viewshed created by the 5 viewpoints in the table above.

The composite viewshed above shows the cells that are visible from at least 3 of the 5 viewpoints specified. (The Percentage of Viewpoints is set to 50%)

The composite viewshed above shows the cells that are visible from at least 1 of the 5 viewpoints specified. (The Percentage of Viewpoints is set to 0)