# GlobalCAD Terrain 2018

## Version 1.2



# Getting Started Guide
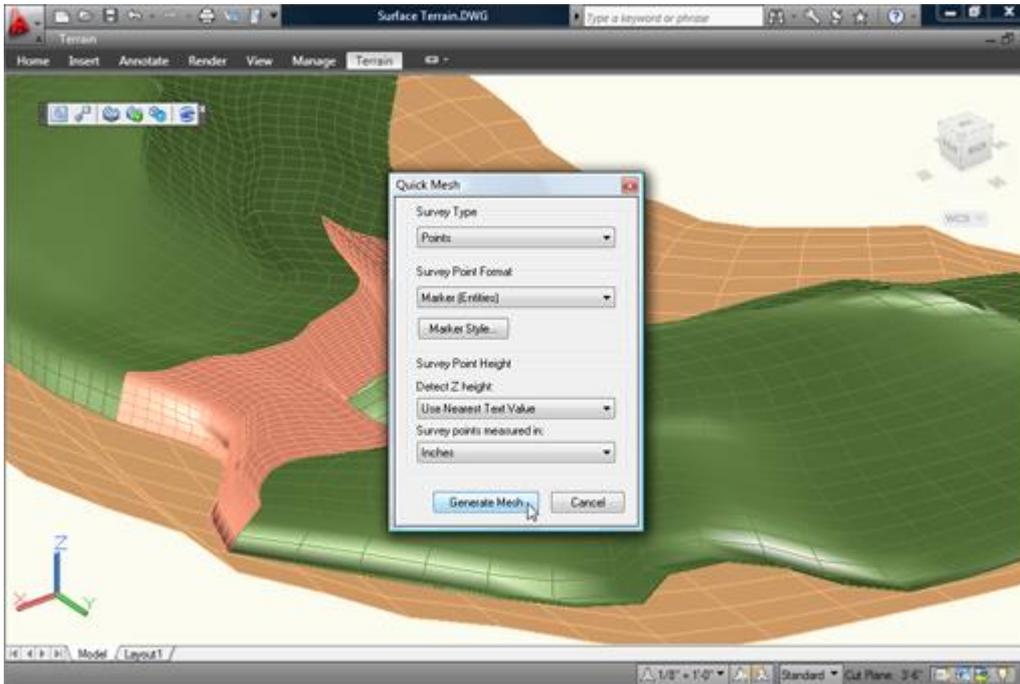
# Contents

# Introduction

The essential tools in GlobalCAD Terrain 2018 make it easy to create accurate and intelligent site surveys and stunning 3D terrain models with a single mouse click!



This user guide provides step-by-step instructions on getting started with GlobalCAD Terrain. Additional product documents and/or tutorials are available from the relevant www.globalcad.com product page.

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GlobalCAD Terrain 2018 is compatible with BricsCAD Pro/Platinum V11-V17 and the entire family of AutoCAD products including AutoCAD 2007-2018, AutoCAD Architecture, AutoCAD Civil 3D, AutoCAD Land Desktop and AutoCAD Map 3D.

The software can also be used in conjunction with other BricsCAD and AutoCAD third-party applications. Multi-user licensing options are available and provide support for all major network platforms including Windows Server.

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# Acknowledgements

GlobalCAD Terrain 2018 (version 1.2).

Our thanks go out to everyone involved in the development and production of GlobalCAD Terrain 2018.

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# To Display or Close Toolbars

Select the **Toolbars** entry from the **Terrain** drop-down menu.

- Right-click the background or title bar of any displayed toolbar, such as the GlobalCAD Terrain toolbar.
- From the shortcut menu, select the toolbar you want to display or close.

Typing TOOLBAR at the AutoCAD/BricsCAD command line displays the Toolbars dialog box, where you can select the Terrain entry from the Menu Group drop-down list. From here the GlobalCAD Terrain toolbar can be turned on or off or customized.

You can display multiple toolbars at once, and you can dock or float toolbars. Docked toolbars lock into place along the top, bottom, or sides of the AutoCAD/BricsCAD window. Floating toolbars move freely – move them using your pointing device. Floating toolbars can overlap other floating and docked toolbars. You can also hide toolbars until you need them.

***Note*** – refer to the relevant **AutoCAD/BricsCAD Help** topics for further details on toolbars.

# The Shortcut Keys

Use the shortcut keys (sometimes called accelerator keys) below at the AutoCAD/BricsCAD *command line* for quick access to GlobalCAD Terrain tools.

Shortcut keys are keys and key combinations that start commands. For example, you can type **GQ** to run the Quick Mesh tool, which is the same result as choosing **Quick Mesh** from the **Terrain** drop-down menu.

| Icon | Command | Shortcut | Description |
|------|---------|----------|-------------|
| | Select Points | **GP** | Provides options for the detection of survey point data within the current drawing prior to generating a surface mesh or solids model. You can also generate new surveys from scratch using 'intelligent' survey markers. |
| | Format Markers | **GX** | Format the appearance of intelligent markers both before and after placing them on the current drawing. |
| | Terrain Model | **GM** | Generates a polyface mesh or volumetric solid from your intelligent survey markers. You can use a polyface mesh if you need hiding, shading and rendering capabilities. Solids can also represent volumetric data. |
| | Quick Mesh | **GQ** | Speeds the process of generating 3D surface terrains. All of the options required to generate a polyface mesh are available in a single compact dialog. |
| | Convert Mesh to Solid | **GC** | Convert existing polyface meshes you find in any drawing to solid models. |

# Ordering Information

GlobalCAD Terrain 2018 is compatible with BricsCAD Pro/Platinum V11-V17 and the entire family of AutoCAD products including AutoCAD 2007-2018, AutoCAD Architecture, AutoCAD Civil 3D, AutoCAD Land Desktop and AutoCAD Map 3D.

The software can also be used in conjunction with other BricsCAD and AutoCAD third-party applications. Multi-user licensing options are available and provide support for all major network platforms including Windows Server.

Free unlimited screen-based technical support is provided, with telephone options also available to registered customers. In addition, all GlobalCAD products carry a 30-day guarantee against defects in material and workmanship.

Purchase orders are accepted only from government and accredited educational institutions and major corporations, provided that they are submitted on purchase order forms with a purchase order number (net 30 days). Please be sure to include the standard order form with your order.

All product orders are dispatched with a printed invoice. For further details, please view the GlobalCAD Terrain 2018 order form.

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# GlobalCAD Terrain

Working with site survey information forms a critical component of any project. Data may be presented in many forms from flat 2D markers to points in space or contours.

GlobalCAD Terrain provides the ability to generate 'intelligent' survey points who's displayed coordinate XYZ values automatically update as soon as the relevant points are moved on the survey drawing.

Furthermore, you can generate 3D surface terrain models (or topographic maps) covering vast areas with a single mouse click. The terrain is developed by connecting the given survey points and forming triangles to create a surface model. Using advanced algorithms, GlobalCAD Terrain can produce these models as a polyface mesh or solids.

External and internal boundaries can also control how a surface model is created. A closed polyline can be used to define the extents of a surface model when used as a boundary. By specifying a boundary around your site, you can ensure that triangles that are formed will not cross over your boundary line. Localized surface models can also be produced to prevent triangulation from occurring in areas around buildings or areas of water.

With GlobalCAD Terrain you can:

- Generate surveys with 'intelligent' survey markers.
- Instantly apply intelligent markers to existing surveys.
- Work with almost any existing survey type.
- Create 3D surface terrains (with mesh and solids options).
- Confine the terrain model to a given boundary line.
- Options to convert existing meshes to solids.

## Initial Steps

GlobalCAD Terrain provides the ability to generate 'intelligent' survey points who's displayed coordinate XYZ values automatically update as soon as the relevant points are moved on the survey drawing.
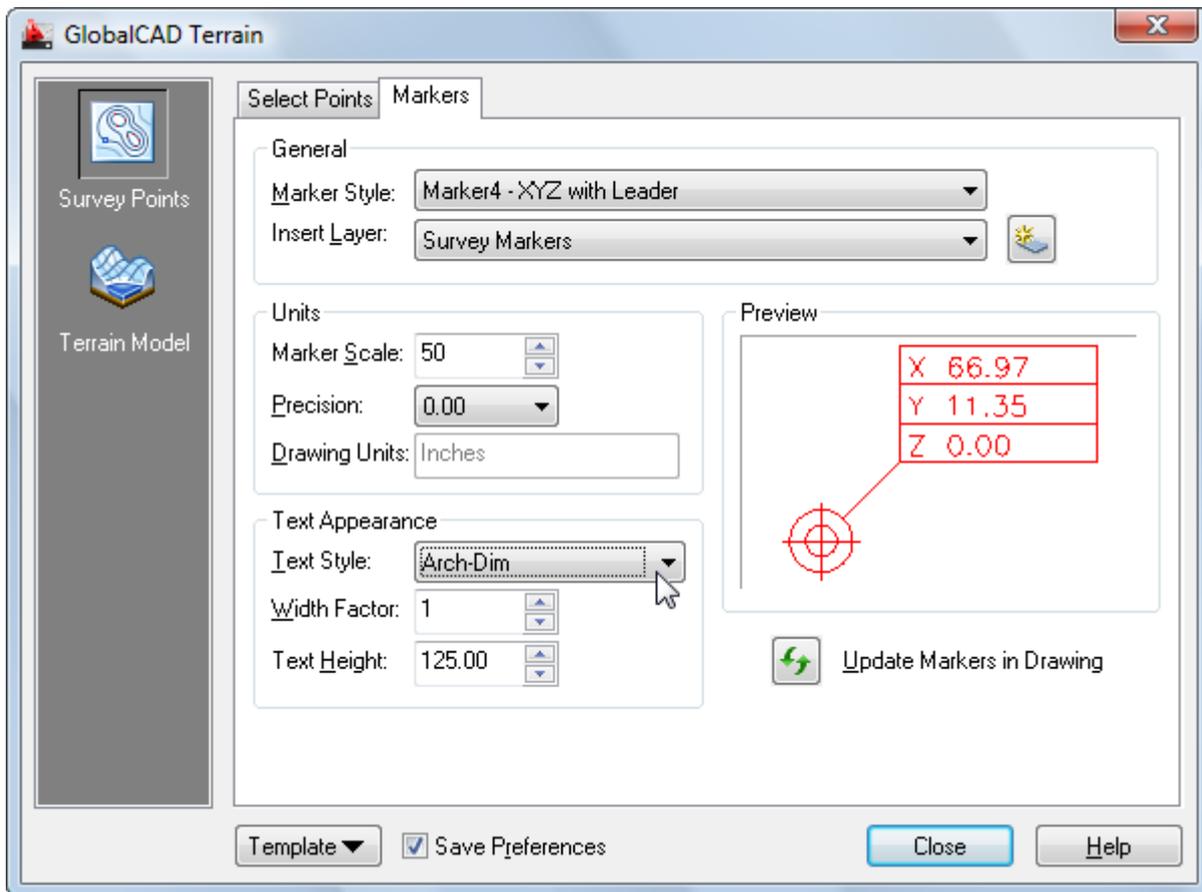


The advanced GUI interface employs tabs for the seamless creation and formatting of survey point markers. Select the **Survey Points** option (shortcut **GP**) from the left places bar to display the tabs.

# Adding Survey Markers

The options on the **Select Points** tab allow you to specify exactly how your existing survey data is presented so that each point and its associated height value can be detected by GlobalCAD Terrain. This allows for 'intelligent' survey markers to be added to each existing point. The addition of these markers is essential since they are used by GlobalCAD Terrain to define the 3D surface terrain.

If you are creating a survey from scratch and wish to utilize 'intelligent' survey markers available within GlobalCAD Terrain, you should use the **Pick Points** method defined under the **Position Markers** group box below. The **Selection (Auto)** option provides an advanced means of detecting existing survey points anywhere within the current drawing.

The method below is for the detection of existing survey points or contours.

- Select one of the following options from the **Survey Type** group box:

  - **Points**. Select this option if your survey drawing contains individual survey points.
  - **Contours**. Select this option if your survey drawing contains contours (constructed from polylines).

- If you have selected Contours, please refer to step 3. For survey Points, choose one of the following options from the **Survey Point Format** group box:

  - **Point**. Choose this option if point objects represent your survey points.
  - **Marker (Entities)**. Use in conjunction with the **Marker Style** button to select a particular marker style where your survey points are represented by entities (not blocks) e.g. by a cross or circle etc.
  - **Block**. Use in conjunction with the **Block Name** button to select a block name where your survey points are represented by a particular block definition.

- Next, select one of the following options from the **Survey Point Height** group box:

  - **Utilize Z Height of Survey Point [or Contour]**. Where the existing survey points are elevated at the correct Z height.
  - **Use Nearest Text Value**. If Text values are present, indicating the survey point height.
  - **Use Nearest MText Value**. If MText values are present, indicating the survey point height.
  - **Use Text/MText Value within Block**. Select this option where Text/MText values indicating the survey point height are present within the survey point block definitions.
  - **Do not Detect Z Height**. Select this option if survey point heights are not available or if you wish to manually elevate the individual intelligent markers following placement.

Often, the units of measurement for survey points can differ with the overall drawing units in a survey drawing. For example, for an imperial survey, the drawing units may be set to Inches whereas the survey points are defined in feet. Likewise, for a metric survey, the drawing units may be millimetres and the survey points measured in meters. For this reason, and to ensure the intelligent markers are placed at the correct Z elevation within the drawing, you should specify the survey point units of measurement in the **Survey points measured in** drop-down list from the Survey Point Height group box.

- Next, select one of the following options from the **Position Markers** group box:

  - **Selection (Auto)**. Use window or crossing to select multiple survey points or all points in the drawing. Intelligent markers will be added to all survey points detected.
  - **Pick Points [or Select Contours]**. Use this option to manually select individual survey points. You will be asked to specify the Z height value for each point together with the units of measurement.

**Notes**

- When using the **Selection (Auto)** feature, you can select all entities in the current drawing. Existing survey points will be automatically detected based on the selections made above and all other drawing entities will be filtered out.

# Formatting Markers

The **Markers** tab (shortcut **GX**) provides the ability to format the appearance of intelligent markers both before and after placement on the drawing.

From the **General** group-box, select one of the available markers from the **Marker Style** drop-down list. You can specify the layer for new markers using the **Insert Layer** drop-down list below. Click the **New Layer** button if you wish to create a new layer for marker insertion.

The following formatting options are available under the **Units** group box:

- **Marker Scale**. Defines the scale for markers so that they are displayed at an appropriate size in the drawing (valid range 1 to 10000).
- **Precision**. Displays and sets the number of decimal places displayed in markers that display an X, Y and/or Z value.

The following formatting options are available under the **Text Appearance** group box:

- **Text Style**. Specifies defined text style names, applicable to markers that display an X, Y and/or Z value.
- **Width Factor**. Sets the character spacing for marker text.
- **Text Height**. Sets the marker text height based on the value you enter.

If you have already placed your intelligent markers and wish to re-define them, simply make your changes to the options above then click the **Update Markers in Drawing** button from the Markers tab.

**Notes**

Any changes you make to the following formatting options will be dynamically represented in the Marker tab's preview image: insertion layer (marker color changes to reflect layer color), units precision and/or text appearance.

# Generating Terrain Models

Once you have placed the intelligent markers on your survey drawing, you are ready to generate a 3D surface terrain. Select the **Terrain Model** option (shortcut **GM**) from the left places bar to display the **Generate Model** tab.
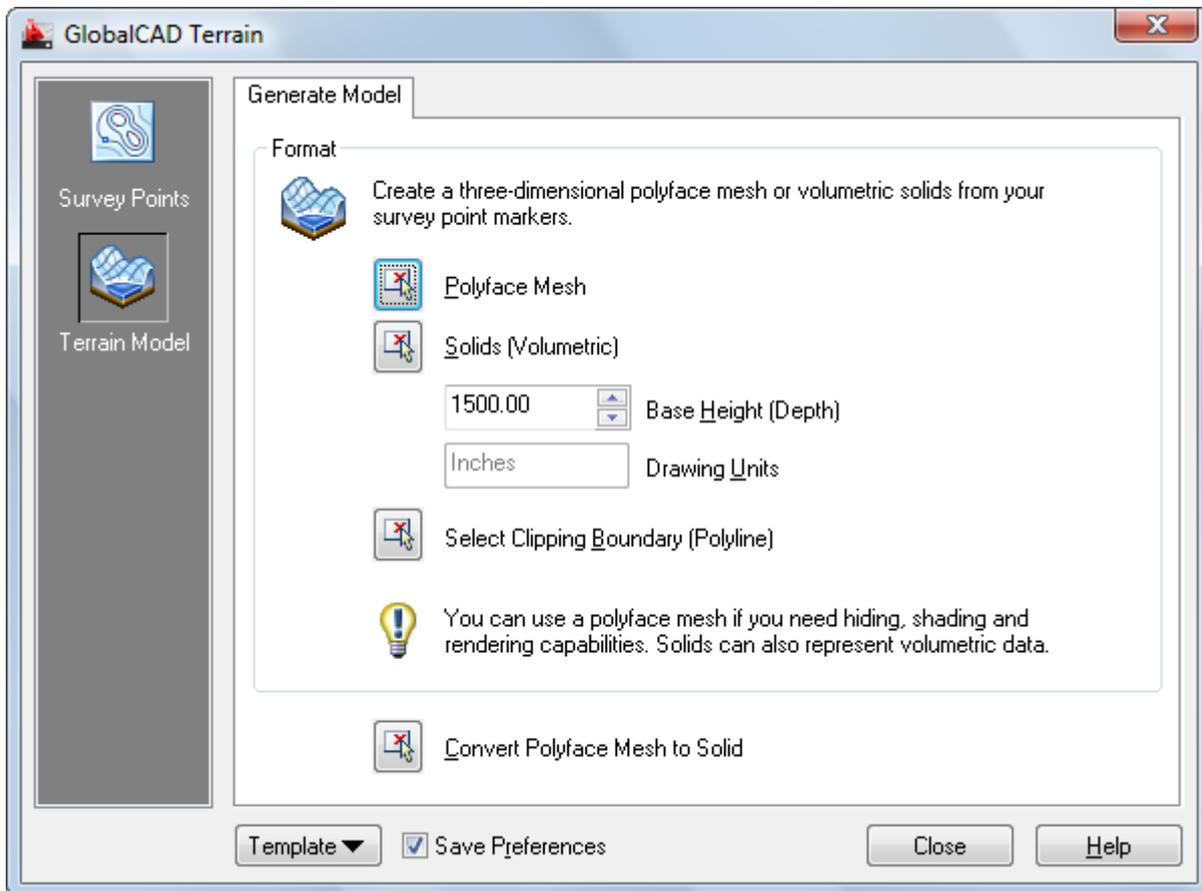


The options on the Generate Model tab allow you to generate a polyface mesh or volumetric solid. You can use a polyface mesh if you need hiding, shading and rendering capabilities. Solids can also represent volumetric data.

Follow the procedure below to construct a polyface mesh:

- Click the **Polyface Mesh** button and select markers within the drawing.

  You can use window or crossing to select multiple markers in the drawing. Existing markers will be automatically detected and all other drawing entities will be filtered out.

  The resulting mesh is produced using the selected markers.

- You can trim the mesh, for example to remove extraneous mesh faces near to the edge of the terrain model, by picking the **Clipping Boundary (Polyline)** button and selecting an existing polyline. The mesh will be trimmed to the extents of the polyline.

Follow the procedure below to construct a solids model:

- Specify a suitable depth for the terrain model in the **Base Height (Depth)** text box.

  The Base Height is determined as the height from the lowest survey point to the underside of the solid model and should be left at 0 (zero) if an extended base thickness is not required.

- Click the **Solids (Volumetric)** button and select markers within the drawing.

  You can use window or crossing to select multiple markers in the drawing. Existing markers will be automatically detected and all other drawing entities will be filtered out.

  The resulting solids model is produced using the selected markers.

- You can trim the solid model, for example to remove extraneous solid sections near to the edge of the terrain model, by picking the **Clipping Boundary (Polyline)** button and selecting an existing polyline. The model will be trimmed to the extents of the polyline.

Notes

- All line segments of the **Clipping Boundary** polyline mentioned above must reside within the extents of the existing mesh for the mesh to be trimmed.
- When using the **Solids (Volumetric)** option, the resulting solid model will be constructed from individual solids elements, each representing a facet within the terrain. You can utilize the AutoCAD/BricsCAD UNION command to combine multiple solids to form a single unified surface terrain if required.
- You can convert existing polyface meshes you find in any drawing to a solid model using the Convert **Polyface Mesh to Solid** button located at the base of the Generate Model tab (or by using the shortcut GC at the AutoCAD/BricsCAD command line).

# Quick Mesh

You can speed the process of generating a 3D surface terrain by using the **Quick Mesh** feature (shortcut **GQ**). All of the options required to generate a polyface mesh are available in a single compact dialog.

- Select one of the following options from the **Survey Type** drop-down list:

  - **Points**. Select this option if your survey drawing contains individual survey points.
  - **Contours**. Select this option if your survey drawing contains contours (constructed from polylines).

- If you have selected Contours, please refer to step 3. For survey Points, choose one of the following options from the **Survey Point Format** drop-down list:

  - **Point**. Choose this option if point objects represent your survey points.
  - **Marker (Entities)**. Use in conjunction with the **Marker Style** button to select a particular marker style where your survey points are represented by entities (not blocks) e.g. by a cross or circle etc.
  - **Block**. Use in conjunction with the Block Name button to select a block name where your survey points are represented by a particular block definition.

- Next, under the **Survey Point Height** group-box, select one of the following options from the **Detect Z Height** drop-down list:

  - **Utilize Z Height of Survey Point [or Contour]**. Where the existing survey points are elevated at the correct Z height.
  - **Use Nearest Text Value**. If Text values are present, indicating the survey point height.
  - **Use Nearest MText Value**. If MText values are present, indicating the survey point height.
  - **Use Text/MText Value within Block**. Select this option where Text/MText values indicating the survey point height are present within the survey point block definitions.
  - **Do not Detect Z Height**. Select this option if survey point heights are not available or if you wish to manually elevate the individual intelligent markers following placement.

Often, the units of measurement for survey points can differ with the overall drawing units in a survey drawing. For example, for an imperial survey, the drawing units may be set to Inches whereas the survey points are defined in feet. Likewise, for a metric survey, the drawing units may be millimetres and the survey points measured in meters. For this reason, and to ensure the intelligent markers are placed at the correct Z elevation within the drawing, you should specify

the survey point units of measurement in the Survey points measured in drop-down list from the Survey Point Height group box.

- Click the **Generate Mesh** button to produce the polyface mesh.