Chapter 1

Introduction to AutoCAD Map 3D 2018

Learning Objectives

After completing this chapter, you will be able to:

- *Understand various terms associated with Map 3D*
- *Start AutoCAD Map 3D 2018*
- *Use workspaces*
- *Work with various components of AutoCAD Map 3D*
- *Use AutoCAD Map 3D Help*

INTRODUCTION

AutoCAD Map 3D is a Geographic Information System (GIS) application developed by Autodesk. This application along with the standard AutoCAD drafting tools is equipped with tools for capturing, editing, updating, and analyzing geospatial data. Moreover, the interoperability feature of this application enables it to read, write, and convert data from one spatial data format to another. AutoCAD Map 3D supports various raster and vector data formats such as .tiff, .dem, .jpeg, .dwg, .shp, .dgn, and .tab. It also supports survey data in file formats such as .xyz, .gps, and .csv. The features in AutoCAD Map 3D enable you to connect to the spatial data using the relational database management system (RDBMS), thereby enhancing the productivity and helping in managing and analyzing a large spatial dataset efficiently.

The tools and options available in AutoCAD Map 3D help you to perform complex geospatial data analysis and obtain accurate results, thus making it ideal for infrastructure planning, management, and decision making.

In this chapter, you will be introduced to the concept of geospatial analysis. Next, you will learn about the user interface of AutoCAD Map 3D and some of the data types that are used in the field of Geographical Information System.

GEOSPATIAL ANALYSIS

Application of statistical analysis and other analytical techniques (such as network analysis, buffer analysis, and overlay analysis) to interpret the data related to a geographical area is known as geospatial analysis. Geospatial analysis includes various methods of data interpretation such as analyzing, interpreting, and presenting the GIS dataset using GIS software. This type of data analysis is widely used in urban planning, landscape designing, geographical mapping, utility management, navigation, and disaster management.

Various types of GIS data such as vector data, raster data, survey data, and point data are used in geospatial analysis. Different types of data are suitable for different types of geospatial analysis. As a result, the selection of the spatial data type depends on the scope and requirement of the project. In case the spatial data is not available in the required data type, the process of conversion of data from one data type into another is usually practiced. Some of the commonly used GIS data are discussed next.

Vector Data

Vector data is a GIS data structure that represents geographical features in point, line, and polygon geometry. It can also store the non-spatial information of the geographic feature in a data table. The vector data format is used to create, edit, analyze, and store large amount of spatial data. Vector data stores geographic features using three basic geometry types, namely point, line, and polygon. These feature data types are discussed next.

Point Feature

A point feature represents a spatial point for a specific object. A post box, street lamp, fire hydrant, and tree are some of the geographical objects that are represented as point objects.

Line or Polyline Feature

A line or polyline feature is used to represent a linear feature or a streamlined feature data such as roads, transmission lines, streams, rivers, pipe networks, and boundaries.

Polygon Feature

A polygon feature (parcel) is a closed polyline object with the attribute or property data attached to it. The polygon feature is used to represent an area feature such as council boundary, plots, farms, zones, wards, and water bodies such as lakes and ponds.

Raster Data

Raster data consists of a matrix of cells, also known as pixels, organized into rows and columns. Each cell in a raster contains a value that represents information, such as elevation and temperature. You can graphically display the data in the raster by using various rendering techniques. These techniques help you to render data in various color schemes.

You can insert a raster file into a drawing and then use it to collect information. In AutoCAD Map 3D, you can also import point files (elevation data) and LiDAR data into the workspace and then generate 3D raster surfaces. You can also analyze and display the raster data using various tools.

Drawing Object and Object Data

In GIS, there are three primary types of geometries: point, line, and polygon. These geometries are used to represent different geographic features in the drawing; for example, a road feature represented using a line segment. These geometries in the drawing are known as the drawing object. The drawing object may also have data associated with it. For example, a road feature may have data such as speed limit, name, and length associated with it. The associated data is known as object data.

Some of the terms used in this book, related to drawing objects, are explained next.

Property

The property of a drawing object refers to the display parameters such as color, thickness, and pattern of drawing object.

Attribute

Attribute refers to the non spatial data that is attached to a drawing object and does not provide any information about the display parameters of the drawing object it is attached to. For example, the area and population of a state attached to a closed polyline object (polygon), records of births and deaths pertaining to a geographical place attached to a point object, number of accidents attached to a line or polyline object (roads, streets, highways, or motor ways).

Data Table

Data table is a way of presenting property and attribute values in the form of a table. It is attached to an object, a layer, or a feature in a Workspace. Figure 1-1 shows various parts of a data table.

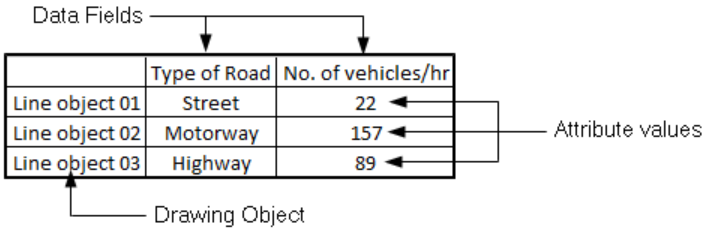

Figure 1-1 *Various parts of a data table*

Data Field

In a data table, the data field displays a group of attribute values related to a specific data object. A data field is also referred to as an attribute or a property.

Attribute Value

Attribute value of a drawing object is the value corresponding to the drawing object in various data fields. For example: attribute value of the **Line object02** drawing object in the **No. of vehicles/hr** data field is **157**, refer to Figure 1-1.

Survey Data

Survey data is the point, line, or polygon data obtained by locating specific survey on the earth surface. Instead of storing survey data in isolated, individual files: GIS allows you to store all survey data in one database. It basically stores 3D data of a particular geographic location. The survey data can be obtained by using survey instruments such as total station, GPS, and so on.

Industry Model Data

Industry Model Data is a new name given to the topobase database. Topobase is the database that includes features, parcels, and attribute data of a geographical location. Industry model data includes project settings, privileges, attribute data, and coordinate and projection systems related to a project. The projects such as infrastructure project management, utility designing, and facility management extensively use the industry model data for project management.

Note

To create an industry model, you need to have the ***Autodesk Infrastructure Administrator*** *application installed on your system. To install this application, select the check box corresponding to* ***Autodesk Infrastructure Administrator 2018*** *while installing the* ***AutoCAD Map 3D 2018*** *software.*

LAYERS

Layers are the overlays containing specific geometry, property, and attributes of a particular feature. You can transform data from one layer to another based on the file formats of data. In AutoCAD Map 3D, you can use layers in the form of the AutoCAD drawing layer *(.dwg)* and the vector or the feature layer *(.shp/.sdf)*. These two layer types are discussed next.

AutoCAD Layer

AutoCAD layer is a drawing layer that contains drawing objects (text, point, line, and polygon) and their properties. You can create and modify a layer within a drawing file. To use AutoCAD

layer in any other software, you will need to export or save the AutoCAD drawing layer in the file format that is recognized by the other software.

Vector or Feature Layer

Vector or feature layer is an independent layer that contains information about all feature data spatially related to a geographical location. This layer can be in the SHP or SDF file format. It is easy to transfer feature data from one software to another using these types of layers.

STARTING AutoCAD Map 3D 2018

From the **Start Menu**, choose **All Programs > Autodesk > AutoCAD Map 3D 2018** (Windows 10), as shown in Figure 1-2; the AutoCAD Map 3D 2018 application will start. Alternatively, double click on the shortcut icon of AutoCAD Map 3D 2018 on the desktop.

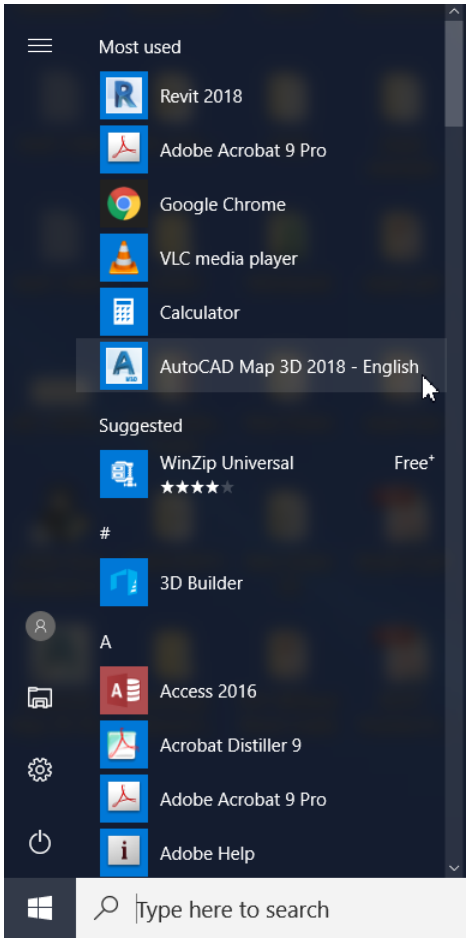

Figure 1-2 *Starting AutoCAD Map 3D 2018*

WORKSPACE

Workspace is a combination of menus, toolbars, Ribbon, palettes, and control panels. It is used to represent a customized drawing environment based on user requirements. You can also customize a workspace to suit the working environment of a task.

When you start AutoCAD Map 3D 2018 for the first time, the **AutoCAD Map 3D - Select Your Default Workspace** window will be displayed, as shown in Figure 1-3. In this window, you can read information about the three predefined workspaces that are available in AutoCAD Map 3D. These workspaces are **Planning and Analysis Workspace**, **Maintenance Workspace**, and **2D Drafting Workspace**.

Tip

You can choose a different workspace at any time after starting AutoCAD Map 3D application. To do so, select the required workspace option from the ***Workspace*** *drop-down list in the Quick Access Toolbar.*

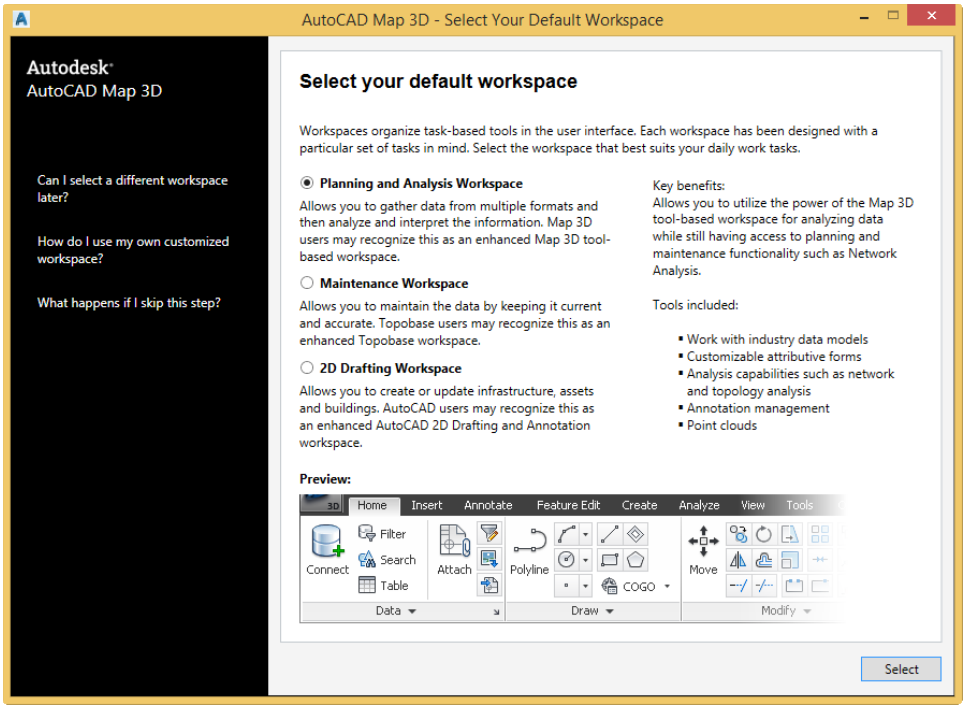

Figure 1-3 *The* ***AutoCAD Map 3D - Select Your Default Workspace*** *window*

To choose a workspace, select the radio button corresponding to that workspace and then choose the **Select** button in the **AutoCAD Map 3D - Select Your Default Workspace** window; the window will be closed and the **AutoCAD Map 3D 2018** screen will be displayed with the selected workspace. The predefined workspaces in AutoCAD Map 3D are discussed next.

Planning and Analysis Workspace

By default, the **Planning and Analysis Workspace** radio button is selected in the **AutoCAD Map 3D - Select Your Default Workspace** window. As a result, when you choose the **Select** button in the window, AutoCAD Map 3D interface opens in the **Planning and Analysis Workspace**. In this workspace, the tools are grouped in different categories based on their uses in layout planning and GIS analysis. Figure 1-4 shows the Ribbon displayed in the **Planning and Analysis Workspace**.

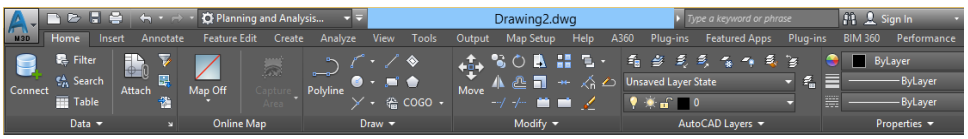

Figure 1-4 *Partial view of the Ribbon in the* ***Planning and Analysis Workspace***

Note

The theory and tutorial sections of all the chapters in this textbook are discussed based on the ***Planning and Analysis Workspace*** *Ribbon interface. Hence, it is recommended to retain default settings unless instructed otherwise.*

Maintenance Workspace

The **Maintenance Workspace** is a Ribbon interface in which tools are grouped in different panels based on their usage in an industry model or project. The tools in this interface are very useful when you are working with an industry model data, an infrastructural project, or a utility project. Also, it helps to administer an entire project by specifying the required privileges to each member of the team. To invoke this workspace, select the **Maintenance Workspace** radio button in the **AutoCAD Map 3D - Select Your Default Workspace** window and then choose the **Select** button; the **Maintenance Workspace** will be displayed in the AutoCAD Map 3D interface. Figure 1-5 shows the Ribbon in the **Maintenance Workspace**. You can use various tools in this workspace to maintain an industry model data.

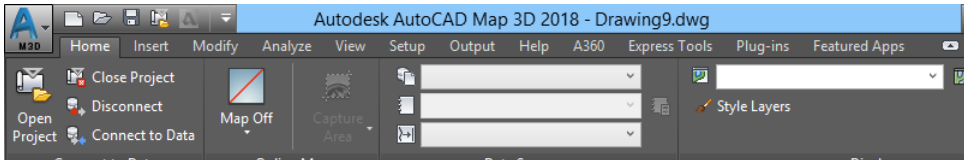

Figure 1-5 *Partial view of the Ribbon in the* ***Maintenance Workspace***

2D Drafting Workspace

The **2D Drafting Workspace** is a customized interface for drafters and designers. This workspace is very helpful for those who are familiar with AutoCAD Ribbon and mostly work with the drawing data. In this workspace, the panels are customized based on the use of each tool in drafting. To invoke this workspace, select the **2D Drafting Workspace** radio button in the **AutoCAD Map 3D - Select Your Default Workspace** window and then choose the **Select** button; the **2D Drafting Workspace** will be displayed in the AutoCAD Map 3D 2018 interface. You can use various tools in this workspace to maintain an industry model data.

SWITCHING WORKSPACES

After starting the AutoCAD Map 3D application, you can switch from one workspace to another workspace. To switch from one workspace to another, select the corresponding option from the **Workspace** drop-down list located in the Quick Access Toolbar, refer to Figure 1-6; the current workspace will be replaced by the selected workspace.

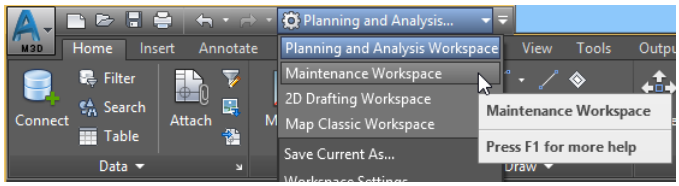

Figure 1-6 *Choosing the* ***Maintenance Workspace*** *option from the* ***Workspace*** *drop-down list*

Note

The procedure of accessing tools and dialog boxes in the ***Map Classic Workspace*** *are different from the procedure used in the other workspaces as mentioned previously in this chapter.*

AutoCAD Map 3D 2018 INTERFACE

AutoCAD Map 3D 2018 interface consists of drawing area, Ribbon, command line, Quick Access Toolbar, **TASK PANE**, model and layout tabs, and status bar, refer to Figure 1-7. The header section of the application interface displays the name of the current drawing file. The different components of the AutoCAD Map 3D 2018 interface are discussed next.

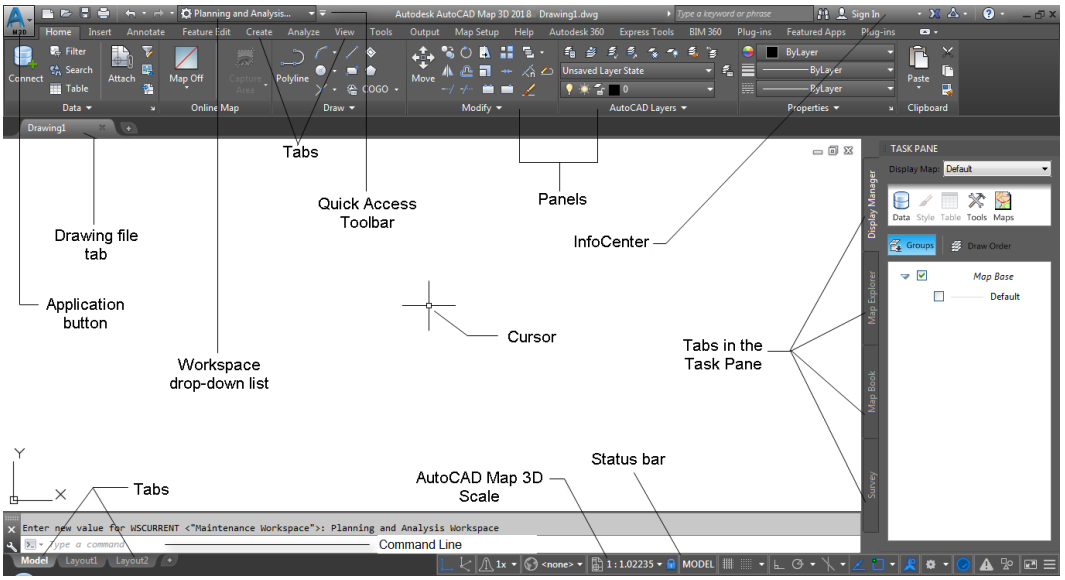

Figure 1-7 *AutoCAD Map3D 2018 interface*

Application Menu

The **Application** button is located at the top-left of the AutoCAD Map 3D 2018 screen. Choose the **Application** button; the Application Menu will be displayed, as shown in Figure 1-8. The menu contains some of the tools that are available in the **Standard** toolbar. Alternatively, press ALT+F to display the tools in the Application Menu. You can search a command using the search field on the top of the Application Menu. To search a command, enter the complete or partial name of the command in the search field; a list showing all possible commands will be displayed. You can click on the desired command from the list to activate it.

By default, the **Recent Documents** button is chosen in the Application Menu. As a result, the recently opened drawings will be listed on the right in the Application Menu. Click on the required file name in the list to open the file. To open a file that is not listed in this menu, choose the **Open** button in the Application Menu; the **Select File** dialog box will be displayed. Browse to the location of the required file. Click on the file name and then choose the **Open** button; the selected file will be opened in the drawing area. In AutoCAD Map 3D 2018, you can specify the settings of the **Display**, **User Preferences**, **Files**, and **Drafting** parameters in the **Options** dialog box. To invoke this dialog box, choose the **Options** button displayed at the bottom-right of the Application Menu. Next, use the options in this dialog box to specify the required parameters.

To exit AutoCAD Map 3D, choose the **Exit AutoCAD Map 3D 2018** button from the Application Menu.

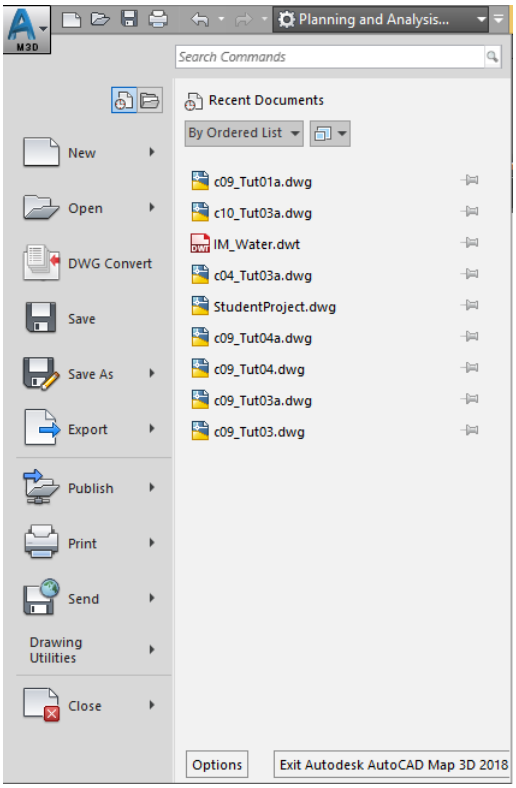

Figure 1-8 *The Application Menu*

Ribbon

Ribbon interface in AutoCAD Map 3D contains tools organized into various tabs and panels based on their functionality, refer to Figure 1-7.

When you start the AutoCAD session for the first time, by default the Ribbon is displayed horizontally below the Quick Access Toolbar. The Ribbon consists of various tabs. These tabs have different panels which in turn have tools arranged in rows. Some of the tools have a small black down arrow. This arrow indicates that the tools having similar functions are grouped together. To choose a tool, click on the down arrow next to them; a drop-down will be displayed. Choose the required tool from the drop-down displayed. Note that if you choose a tool from the drop-down, the corresponding command will be invoked and the tool that you have chosen will be displayed in the panel. For example, to draw a circle using the **2-Point** option, click on the down arrow next to the **Center, Radius** tool in the **Draw** panel of the **Home** tab; a drop-down will be displayed. Choose the **2-Point** tool from the drop-down and then draw the circle. You will notice that the **2-Point** tool is displayed in place of the **Center, Radius** tool. In this textbook, the tool selection sequence will be written as choose **2-Point** tool from **Home > Draw > Circle** drop-down.

The tools which are not displayed within the available area of the panel are placed in the expandable area of the panel. Panels with an expandable area have a down arrow displayed 

to the right of its name. To view the tools in the expandable area of the panel, you can choose the down arrow. You can click on the push-pin in the expanded panel to keep it in the expanded state. Also, some of the panels have an inclined arrow at the lower-right corner. When you click on the inclined arrow, a dialog box is displayed. You can define the settings of the corresponding panel in this dialog box.

AutoCAD Map 3D allows you to change the default location of the Ribbon interface. To do so, right-click on the blank space in the Ribbon; a shortcut menu is displayed. Next, choose the **Undock** option from this menu; the Ribbon is undocked. After undocking the Ribbon, you can move, resize, anchor, and turn on the auto-hide option for the display of the Ribbon. To do so, right-click on the heading strip in the Ribbon; a shortcut menu will be displayed. Choose the required option from this menu. For example, to vertically anchor the floating Ribbon to the left of the drawing area, right-click on the heading strip of the floating Ribbon; a shortcut menu is displayed. Next, choose the **Anchor Left <** option from the shortcut menu; the Ribbon will be anchored to the left.

You can also customize the display of tabs and panels in the Ribbon. To do so, right-click on any of the tools in it; a shortcut menu will be displayed. On moving the cursor over one of the options, a flyout will be displayed with a tick mark before all the options. Also, the corresponding tab or panel will be displayed in the Ribbon. Select/clear the appropriate option to display/hide a particular tab or panel. You can also reorder the display of panels in the tab. To do so, press and hold the left mouse button on the panel to be moved. Next, drag it to the required position and release the mouse button; the panel will be moved.

Drawing File Tabs

The Drawing File tabs displayed above the drawing area, refer to Figure 1-7, show the drawings that are currently opened. Using these tabs, you can quickly switch between drawings. The order in which these tabs are displayed is based on the sequence in which the files were opened.

Drawing Area

The drawing area covers the major portion of the screen. In this area, you can draw objects by using various tools/commands. To draw an object, you need to define coordinate points. You can do so by using the pointing device. The cursor represents the position of the pointing device on the screen. There is a coordinate system icon at the lower-left corner of the drawing area.

Drawing Status Bar

The **Drawing Status Bar** is displayed at the bottom of the drawing area and below the command window, refer to Figure 1-9. To customize the status bar options, choose the **Customization** button on the status bar; a flyout will be displayed. Choose options according to your needs. The **Drawing Status Bar** displays the **Coordinate System**, **Vertical Exaggeration**, **Isolate Object**, and **AutoCAD Map 3D Scale** buttons. Various options in the **Drawing Status Bar** are discussed next.

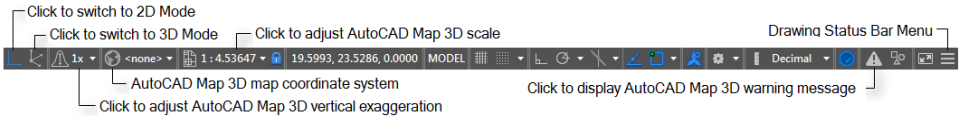

Figure 1-9 *The options in the* ***Drawing Status Bar***

2D Mode Button

The **2D Mode** button is used to make platform for 2D working environment. When you apply the *map2d.dwt* template settings to the current drawing, you will enter the 2D drafting and designing environment and the **2D Mode** button will be activated. The *map2d.dwt* is a template file that contains the settings of the 2D drawing environment.

3D Mode Button

The **3D Mode** button is used to switch from 2D to 3D working environment. When you apply the settings from the *map3d.dwt* template file, you will enter the 3D designing environment and the **3D Mode** button will be activated.

Vertical Exaggeration

The Vertical Exaggeration is used to change the vertical scale of the drawing. It is used to raise or lower the vertical features which might appear too small or too big relative to the horizontal scale in the drawing. To specify the exaggeration factor for visual enhancement, click on the down-arrow next to the **Vertical Exaggeration** button in the **Drawing Status Bar**; a flyout will be displayed. In this flyout, choose the required option; the display of the raster image will be enhanced based on the factor selected. Figure 1-10 shows the view of a raster image at the default vertical exaggeration (**1x**). Figure 1-11 shows an enhanced view of the raster image at vertical exaggeration of **2x**.

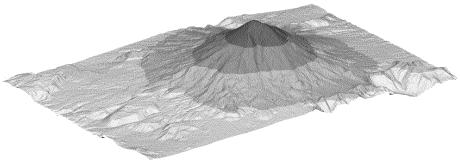

Figure 1-10 *Model vertically exaggerated to* ***1x***

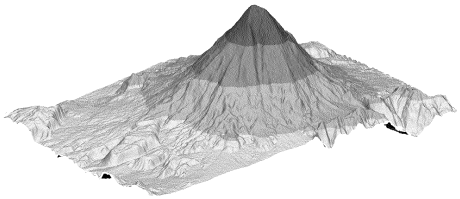

Figure 1-11 *Model vertically exaggerated to* ***2x***

You can also specify a custom value for vertical exaggeration. To do so, click on the down-arrow corresponding to the **Vertical Exaggeration** option; a flyout will be displayed. In this flyout, choose the **Custom** option, as shown in Figure 1-12; a window will be displayed. In this window, enter the desired value in the **Enter Exaggeration Value** edit box and then choose the **OK** button; the window will be closed and the raster image will be vertically exaggerated to the specified value.

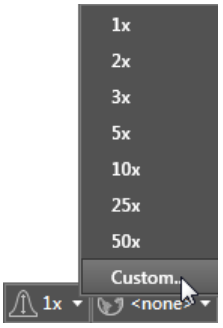

Figure 1-12 *Choosing the* ***Custom*** *option for vertical exaggeration*

Warning Button

The **Warning** button is used to display the details of the errors that have occurred while performing an action. By default, this button is inactive. When an error occurs, this button becomes active (it will be highlighted in yellow color). To view the description of the error occurred, click on the **Warning** button; the **AutoCAD Map Messages** dialog box will be displayed. This dialog box has two areas: **Messages** and **Message details**. Next, select a message in the **Messages** area; the details pertaining to the selected

message will be displayed in the **Message details** area. You can use the **Show Log File** button to view additional information about the selected option. On choosing this button, the log file of the error will be displayed in a text editor such as Notepad.

Click to link/unlink AutoCAD Map 3D stylization while zooming

After a style has been applied to a vector data, you can use this button to link or unlink the AutoCAD Map 3D stylization while zooming. If the lock in this button is closed, the style applied to the vector layer will be displayed at different zooming scales (stylization linked). If the lock in this button is open, the style applied to a vector layer will not be displayed (stylization is not linked).

Annotation Scale

The **Annotation Scale** option has a drop-down list that displays all the annotation scales available for the current drawing. The annotation scale is used to control the size and display of the annotative objects in the model space.

Annotation Objects

If this option is selected, then the annotated objects in the drawing are scaled automatically based on the scale selected in the **Annotation Scale** drop-down list.

Drawing Coordinates

The information about the coordinates is displayed on the left side of the **Status Bar**. You can set the display of coordinates in the **Status Bar** to static or dynamic. To change the coordinate display settings in the **Status Bar**, enter **COORDS** in the command line; you will be prompted to specify a new value. Specify a new **COORDS** value in the command line. If the value is set to 0, the coordinate display will be static, which means that the coordinate values displayed in the **Status Bar** will change only when a point is specified. Setting the value of the **COORDS** variable to 1, 2, or 3 will display the coordinate in dynamic mode. If the variable is set to 1, AutoCAD Map 3D constantly displays the absolute coordinates of the graphics cursor with respect to the UCS origin.

Note

*When you assign a global coordinate system to a workspace, the coordinates of a spatial point with reference to the assigned coordinate system will be displayed in the **Drawing Coordinates** area.*

Infer Constraints

You can choose the **Infer Constraints** button to automatically apply the geometric constraints while you create or edit a geometric object.

Snap Mode

The **Snap Mode** button is chosen to activate the grid snap mode. If this mode is activated, the cursor will move in fixed increments using the current settings of the snap grid. The F9 key acts as a toggle key to turn the snap mode off or on. To change the snap spacing, right-click on the **Snap Mode** button; a shortcut menu will be displayed. Choose the **Settings** option from the menu; the **Drafting Settings** dialog box will be displayed with the **Snap and Grid** tab chosen by default. In the **Snap spacing** area of this tab, specify the required snap spacing along the X and Y axes in the corresponding edit boxes. Next, choose the **OK** button to apply the settings.

Grid

The grid lines are used as reference lines to draw objects in AutoCAD Map 3D. Choose the **Grid** button to toggle the display of the grid in the drawing area. Alternatively, you can use the F7 key to toggle the grid display. To change the spacing of the grid lines, right-click on the **Snap Mode** button; a shortcut menu will be displayed. Choose the **Settings** option from the menu; the **Drafting Settings** dialog box will be displayed with the **Snap and Grid** tab chosen. In the **Grid spacing** area of this tab, specify the required spacing along the X and Y axes in the corresponding edit boxes. Next, choose the **OK** button to apply the settings.

Ortho Mode

This button is used to activate or deactivate the ortho mode. When this mode is active, you can draw lines at right angles only. Alternatively, choose the F8 key to turn this mode on or off.

Polar Tracking

If you turn the polar tracking on, the movement of the cursor is restricted along a path determined by the angle set as the polar angle. Choose the **Polar Tracking** button to turn the polar tracking on or off. You can also use the F10 key to turn this option on or off. Note that turning the polar tracking on, automatically turns off the ortho mode.

Object Snap

You can use the **Object Snap** button to turn the object snap mode on or off. Alternatively, you can use the F3 key to turn the object snap mode on or off. Note that the status of **OSNAP** (off or on) does not prevent you from using the immediate mode object snaps.

3D Object Snap

When this button is chosen, you can snap the key point on a solid or a surface. You can also use the F4 key to turn the 3D object snap on or off.

Object Snap Tracking

When you choose this button, the inferencing lines will be displayed. Inferencing lines are dashed lines that are displayed automatically when you select a sketching tool and track a particular key point on the screen. On choosing this button, the object snap tracking turns on or off.

Allow/Disallow Dynamic UCS

On choosing this button, you are allowed or disallowed the use of dynamic UCS. Allowing the dynamic UCS ensures that the XY plane of the UCS is dynamically aligned with the selected face of the model. You can also use the F6 key to turn the **DUCS** button on or off.

Dynamic Input

The **Dynamic Input** button is used to turn the **Dynamic Input** on or off. Turning it on facilitates the heads-up design approach because all the commands, prompts, and dimensional inputs will now be displayed in the drawing area and you do not need to look at the Command prompt all the time. This saves the design time and also increases the efficiency of the user. If the **Dynamic Input** mode is turned on, you will be allowed to enter the commands through the **Pointer Input** boxes and the numerical values through the **Dimensional Input**

boxes. You will also be allowed to select the command options through the **Dynamic Prompt** options in the graphics window. To turn the **Dynamic Input** on or off, use the CTRL+D keys.

Show/Hide Lineweight

Choose this button to turn on or off the display of lineweights in the drawing. If this button is not chosen, the display of lineweight will be turned off.

Show/Hide Transparency

This button is used to turn on or off the transparency set for a drawing. You can set the transparency in the **Properties** panel or in the layer in which the sketch is drawn.

Quick Properties

If you select a sketched entity when this button is chosen in the **Status Bar**, the properties of the selected entity will be displayed in a panel.

Model or Paper source

The **Model or Paper source** button is used to switch between the model space and paper space while in the layout space environment. Switching to model space while in the layout environment will enable you to work on the drawing objects in the model. To switch to model space in the layout environment, choose the **Model or Paper source** button; the drawing objects in the model will become editable and the text on the button will change from **PAPER** to **MODEL**. To switch back to paper space, choose the **Model or Paper source** button; the paper space will be invoked and now you can work with the map elements in the layout.

Note

*You can invoke the Layout space environment or the Model space environment in the drawing window by choosing the **Model** or **Layout** tab displayed at the bottom left of the drawing window, refer to Figure 1-7.*

Toolbar/Window Positions Unlocked

The **Toolbar/Window Positions Unlocked** button is used to lock and unlock the positions of the toolbars and the windows. When you choose this button, a shortcut menu is displayed. Choosing the **Floating Toolbars/Panels** option allows you to lock the current position of the floating toolbars. Also, a check mark is displayed against those toolbars in the shortcut menu that are currently locked. Choosing the **Docked Toolbars/Panels** option from the shortcut menu allows you to lock the current position of all the docked toolbars. Similarly, you can lock or unlock the position of floating and docked windows such as the **Properties** window or the **Tool Palettes**. If you move the cursor on the **All** option, a cascading menu is displayed that provides the option to lock and unlock all the toolbars and windows.

Selection Cycling

You can use this button to select an object from the group of two or more overlapping or closely placed entities. To select an object from the overlapping entities, choose the **Selection Cycling** button in the **Status Bar**; the selection cycling mode will be activated. Next, click at the required location to select an object; a list box will be displayed. This list box contains a list of objects at the selected location. Choose the required object from the list to proceed.

Command Line

The **Command Line** is located at the bottom of the drawing area where you can enter commands to execute an action. It also displays the subsequent prompt sequences and messages. You can change the size of the **Command Line**. To do so, place the cursor on the top edge of the command line; the cursor will change into a double line bar known as the grab bar. Click and drag the command line to change the size. This way you can increase its size to see all the previously used commands. Alternatively, you can press CTRL+9 to show or hide the **Command Line**. You can also press the F2 key to display the **AutoCAD Text window** which displays the previous commands and messages, as shown in Figure 1-13.

*Figure 1-13 The **Command Line***

TASK PANE

The **TASK PANE** is displayed on the right in the AutoCAD Map 3D 2018 screen, as shown in Figure 1-14. To hide/show the **TASK PANE** in the interface, choose the **Map Task Pane** button in the **Palettes** panel of the **View** tab.

You will find alternative options to the Ribbon interface in the **TASK PANE**. In the **TASK PANE**, there are four tabs: **Display Manager**, **Map Explorer**, **Map Book**, and **Survey**. These tabs are explained next.

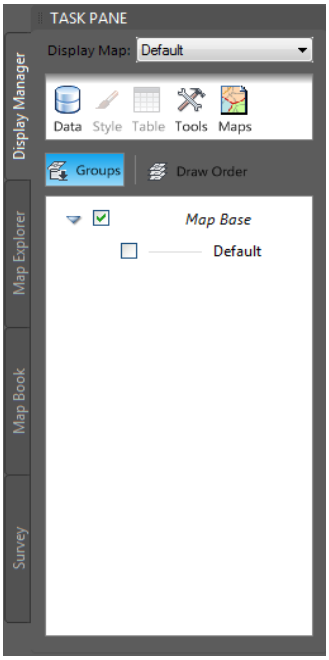

*Figure 1-14 The **TASK PANE***

Display Manager Tab

The options in the **Display Manager** tab are used to connect and display feature layers and then perform various types of analysis on these feature layers.

Map Explorer Tab

The options in the **Map Explorer** tab are used to assign the rights of a drawing to a user, attach new drawings to the current drawing, define queries, and so on.

Map Book Tab

The options in the **Map Book** tab are used to divide a large map into small tiles. You can then render each tile on a separate page. You can publish map book online or can have paper print.

Survey Tab

The options in the **Survey** tab are used to import and export the survey data, and create a data store.

Navigation Bar

In AutoCAD Map 3D 2018, the commonly used tools for navigation are grouped together in a toolbar known as the **Navigation Bar**. By default, this toolbar is placed on the top right corner in the drawing area. Figure 1-15 shows the **Navigation Bar** available in the AutoCAD Map 3D 2018. The tools in the **Navigation Bar** are discussed next. Note that if the **Navigation Bar** is not visible then you can invoke it by using the NAVBAR command.

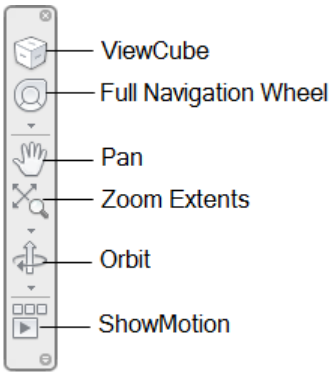

Figure 1-15 *The tools in the* ***Navigation Bar***

ViewCube

The **ViewCube** tool is used to switch between the standard and isometric views or to roll the current view.

Full Navigation Wheel

The Navigation Wheel has a set of navigation tools such as pan, zoom, and orbit. You can use any of these options to set the view of a drawing in the drawing window.

Pan

This tool allows you to view the portion of the drawing that is outside the current display area. To view the outside portion, choose this tool, press and hold the left mouse button, and then drag the drawing area. Press ESC to exit this tool.

Zoom

A list of various zoom tools is displayed in the **Zoom** drop-down. The options in the **Zoom** drop-down are used to enlarge or reduce a view in the drawing window without affecting the actual shape and size of the objects in this view and generally by default, zoom extents tab is chosen.

Orbit

The tools in the **Orbit** drop-down are used to rotate a view in the drawing window in the 3D space.

ShowMotion

Choose this button to capture different views in a sequence and animate them when required.

InfoCenter Bar

By default, the **InfoCenter** bar is located on the right side in the AutoCAD Map 3D application title bar. This bar contains various options for accessing the help and online resources for AutoCAD Map 3D. Figure 1-16 shows various tools and options in the **InfoCenter** bar. Some of the options in this bar are discussed next.

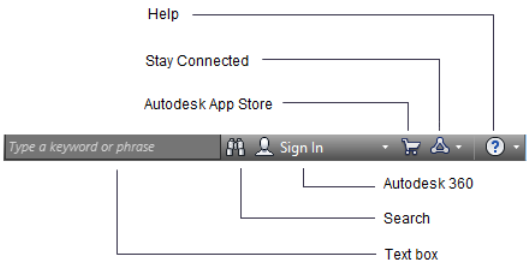

Figure 1-16 *The* ***InfoCenter*** *bar*

Autodesk 360

Autodesk 360 is a cloud computing platform introduced by Autodesk. This platform provides a set of cloud services and products that can help you share, simulate, visualize and design your work. You can access the Autodesk 360 services by using your Autodesk ID.

To login to your Autodesk 360 account, choose the **Sign In** button in the **InfoCenter** bar; a drop-down list will be displayed. Next, select the **Sign In to Autodesk 360** option from this list; the **Autodesk-Sign In** dialog box will be displayed, as shown in Figure 1-17. Enter your credentials in this dialog box and choose the **Sign In** button; Autodesk will validate your credentials and will provide access to your account.

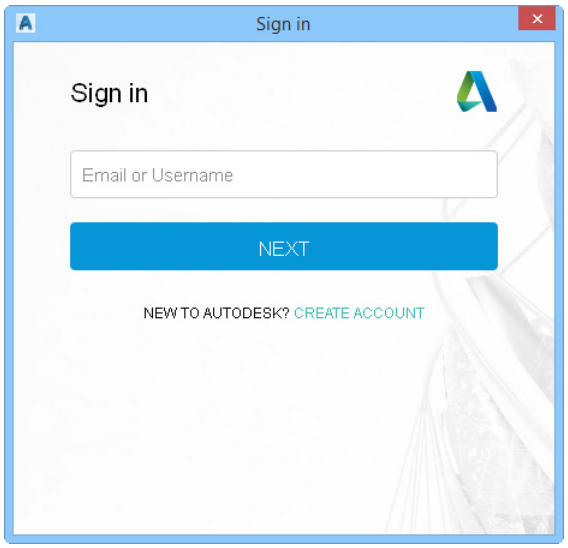

Figure 1-17 *The* ***Autodesk - Sign In*** *dialog box*

After you login to your account, you can use various Autodesk 360 services such as the Live maps, data sharing, and so on. The usage of these services is discussed in detail in further chapters.

Tip

You can sign up for a free Autodesk ID by choosing the ***Need an Autodesk ID?*** *link in the* ***Autodesk - Sign In*** *dialog box.*

Autodesk Exchange Apps

On choosing the **Autodesk Exchange Apps** button from the **InfoCenter** bar, the Autodesk Exchange Apps website will be opened. This website is an online resource from where you can browse and download e-books, models, training materials, and add-ons for your AutoCAD product. Some of the products available are free to download.

Stay Connected

The option in this drop-down list is used to view and manage your Autodesk profile. When you choose the **Autodesk Account** option from this drop-down list, the **Autodesk-Sign In** page will be displayed wherein you can manage your profile.

InfoCenter Text Box and Search Button

If you need to search the AutoCAD Map 3D help based on a keyword, you can enter the required keyword in the text box of the **InfoCenter** bar and then choose the **Search** button. The application will search for the available topics related to the keyword entered, and will display the results in the **Autodesk AutoCAD Map 3D Help** window.

Note

You can also invoke the ***Autodesk AutoCAD Map 3D Help*** *window by pressing the* ***F1*** *key.*

Help

This drop-down list contains the options that provide links to various useful resources such as download offline help and language pack for Map 3D. Figure 1-18 shows various options available in the **Help** drop-down list.

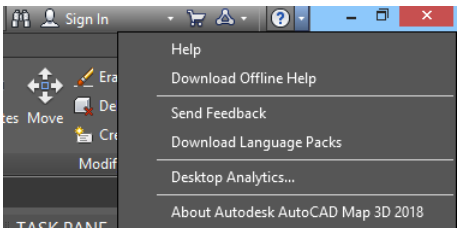

Figure 1-18 *The options in the* ***Help*** *drop-down list*

You can also invoke the **Autodesk AutoCAD Map 3D 2018 - Help** window by selecting the **Help** option from this drop-down list. Figure 1-19 shows the default view of the **Autodesk AutoCAD Map 3D Help** window.

The default view of the **Autodesk AutoCAD Map 3D 2018 - Help** window provides you with the links to various Autodesk resources. These resources are organized into two basic categories:

Learn and **Resources**. You can explore the required resource by following the link displayed below the resource name.

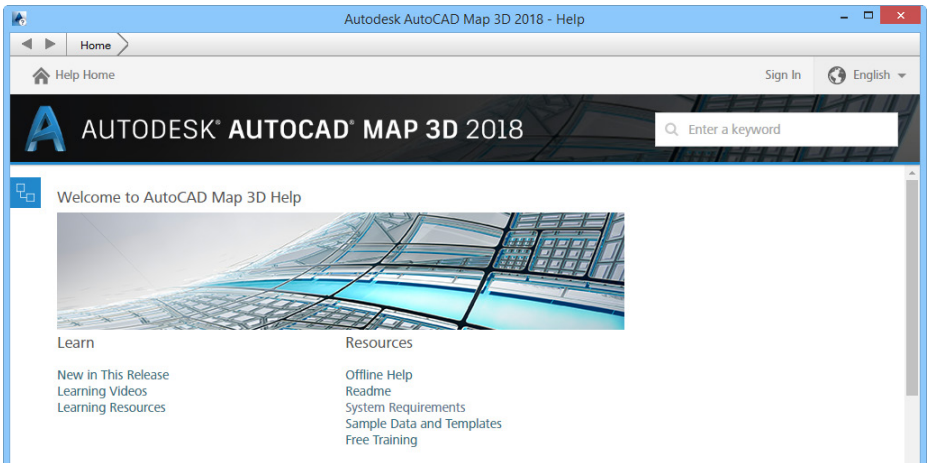

Figure 1-19 *Partial View of the* ***Autodesk AutoCAD Map 3D 2018 - Help*** *window*

You can also use the options in the various tabs displayed in the left pane of the **Autodesk AutoCAD Map 3D 2018 - Help** window to search and view the help topics in AutoCAD Map 3D. You can choose the **Contents** tab to browse through the help topics that are arranged in a hierarchical order. You can also search the available help for a topic of your interest. To do so, specify the required keyword in the search text box of the **Search** tab and then press ENTER; the topics related to the specified keyword will be listed along with a short description in the left pane. Next, choose the required topic from this list; the content will be displayed in the right pane.

More Help

In AutoCAD Map 3D, you can access help using various methods as per your requirement. Some of these methods are listed on the below:

1. **Access help from the command bar:** While specifying a command through the command line, AutoCAD Map 3D displays a list of matching commands. This list also displays the **Search in Help** and **Search on Internet** buttons for the option highlighted in the list. You can choose the **Search in Help** button to search for relevant information about the selected option in the AutoCAD Map 3D help. Alternatively, you can choose the **Search on Internet** button to search for information online. Figure 1-20 shows the **Search on Internet** button being chosen from the displayed list.

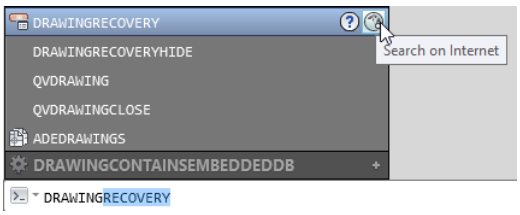

Figure 1-20 *Choosing the* ***Search on Internet*** *button*

2. **Displaying the Tooltip:** You can display help regarding various tools and buttons in form of tool tips. To do so, hover the pointer over a tool or button; a short description related to the chosen button or tool will be displayed in a tooltip. To activate or deactivate a tooltip, invoke the **Options** dialog box by entering the **OP** command in the command line. Next, choose the **Display** tab in the **Options** dialog box. In the **Window Elements** area of the **Display** tab, select or clear the **Show ToolTips** check box to activate or deactivate the tooltip, refer to Figure 1-21.

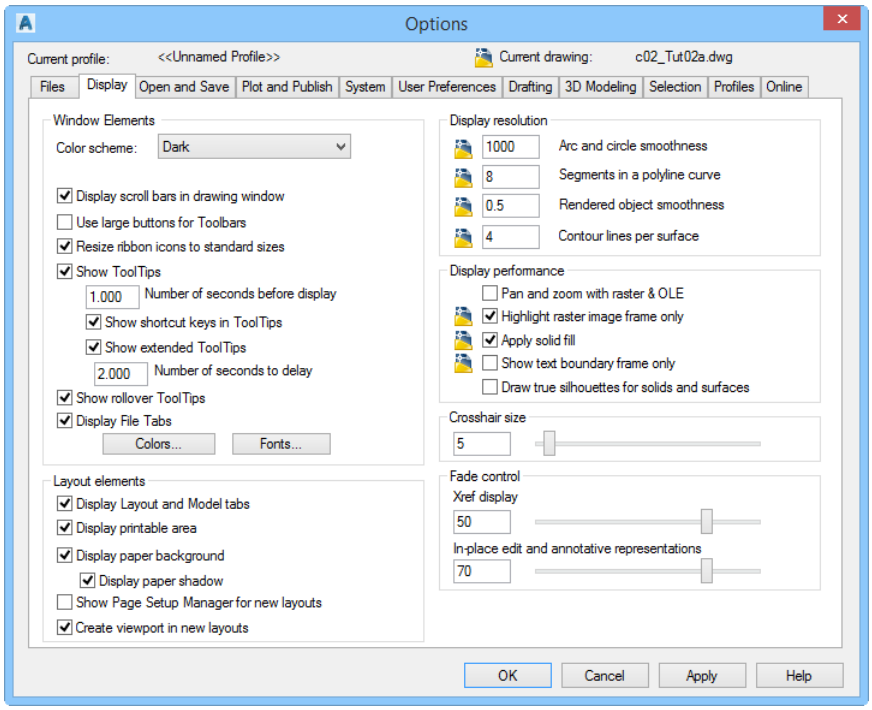

Figure 1-21 *Selecting the* ***Show ToolTips*** *check box in the* ***Options*** *dialog box*

3. Almost all dialog boxes in AutoCAD Map 3D have a **Help** button. You can access help on various topics by choosing this button. In case, the **Help** button is not displayed in a dialog box, press the F1 key on the keyboard; the help window for the dialog box will be displayed.

AutoCAD Map 3D DIALOG BOXES

There are certain commands which when invoked display a dialog box. A dialog box is a secondary window that allows the users to specify attributes and parameters to perform different tasks. It is also used to provide the users with information or progress feedback. A typical dialog box has a name assigned to it. It also contains controls such as the radio buttons, text or edit boxes, check boxes, slider bars, image boxes, and command buttons. Figure 1-22 shows some of the components in a dialog box.

The Title Bar displays the name of a dialog box. Tabs contain various sections with a group of related options under them. The check boxes are toggle options for making the corresponding option available or unavailable. The drop-down list displays a list of items to choose from. The text box is an area where you can enter any text such as file name. It is also called an edit box because you can make changes to the text entered in it. In some dialog boxes, there is the **[...]**

button which when chosen displays another related dialog box. There are certain command buttons (**OK**, **Cancel**, and **Help**) at the bottom of the dialog box.

The names of these buttons imply their functions. The button with a dark border is the default selected button. A dialog box may also have a **Help** button which when clicked will show related help on various features of the dialog box.

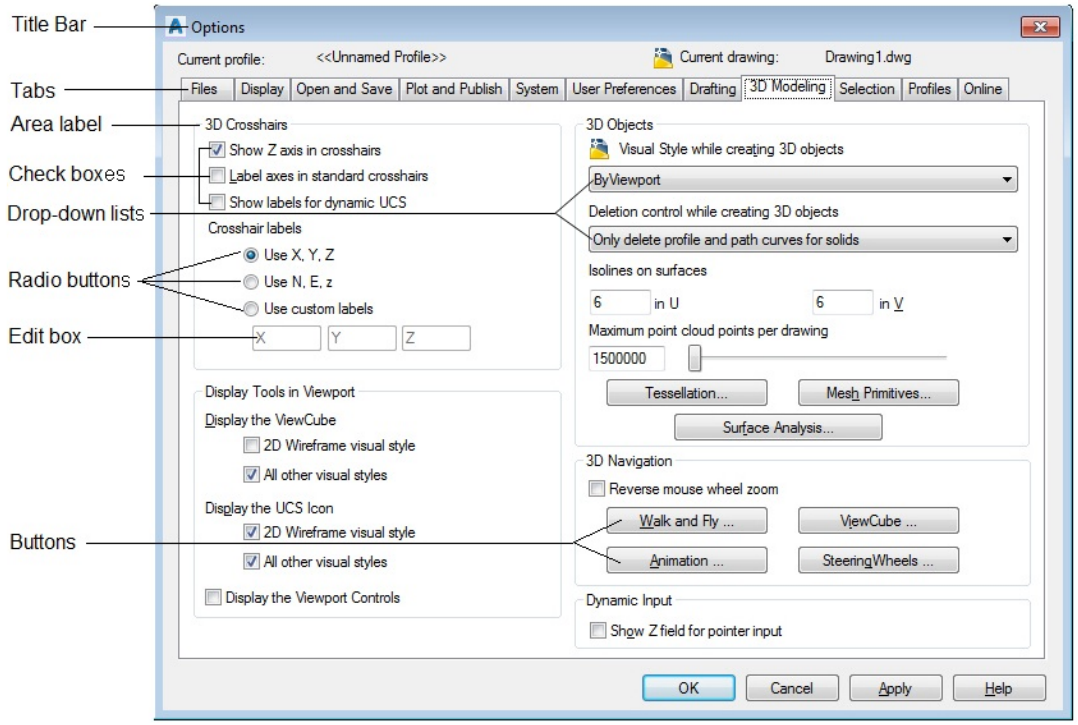

Figure 1-22 *Components of a dialog box*

COMMONLY USED ABBREVIATIONS IN GIS

Some of the commonly used file formats and abbreviations in the field of GIS are listed in the table below.

Abbreviation	Description
GIS	Geographical Information System
DWG	Drawing file (AutoCAD file format)
DWT	Drawing template file (AutoCAD file format)
DWF	Design Web Format (AutoCAD file format)
SHP	Shape file (ESRI file format)
SDF	Spatial Data File (Autodesk file format)
CSV	Comma Separated Values (MS Excel file format)
TXT	Text file
JPEG	Joint Photographic Experts Group (Image file)

TiFF	Tagged Image File Format (Image file)
ISD	Index file generated for point cloud data
LAS and LSD	LiDAR data file format
GPS	Global Positioning System
CAD	Computer Aided Design
TIN	Triangular Irregular Networks
DBMS	Database Management System
AM/FM	Automated Mapping/Facilities Management
PRJ	Projection
UTM	Universal Transverse Mercator
WGS	World Geodetic System
IDW	Inverse Distance Weighted
RMSE	Root Mean Square Error
GCP	Ground Control Points
COGO	Coordinate Geometry
NAD	North American Datum
DEM	Digital Elevation Model
DIME	Dual Independent Map Encoding
DPI	Dots Per Inch
CRS	Coordinate Reference System

Self-Evaluation Test

Answer the following questions:

1. The _____ **Workspace** is used for layout planning and GIS analysis.

2. You can specify the settings of the **Display**, **User Preferences**, **Files**, and **Drafting** parameters in the _____ dialog box.

3. The _____ button helps to snap the key point on a solid or a surface.

4. The **COORDS** command is used to change the coordinate display settings in the **Status Bar**. (T/F)

5. The options in the **Survey** tab are used to divide a large map into small tiles. (T/F)

Answers to Self-Evaluation Test

1. Planning and Analysis, **2. Options**, **3. 3D Object Snap**, **4.** T, **5.** F