

# Using Google Earth to Make a Map



AURORA RESEARCH INSTITUTE

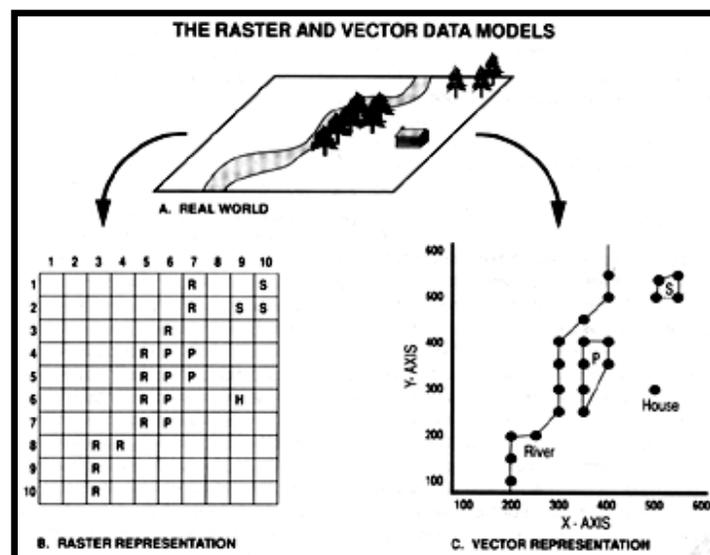
A U R O R A C O L L E G E

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# 1. Introduction to Google Earth

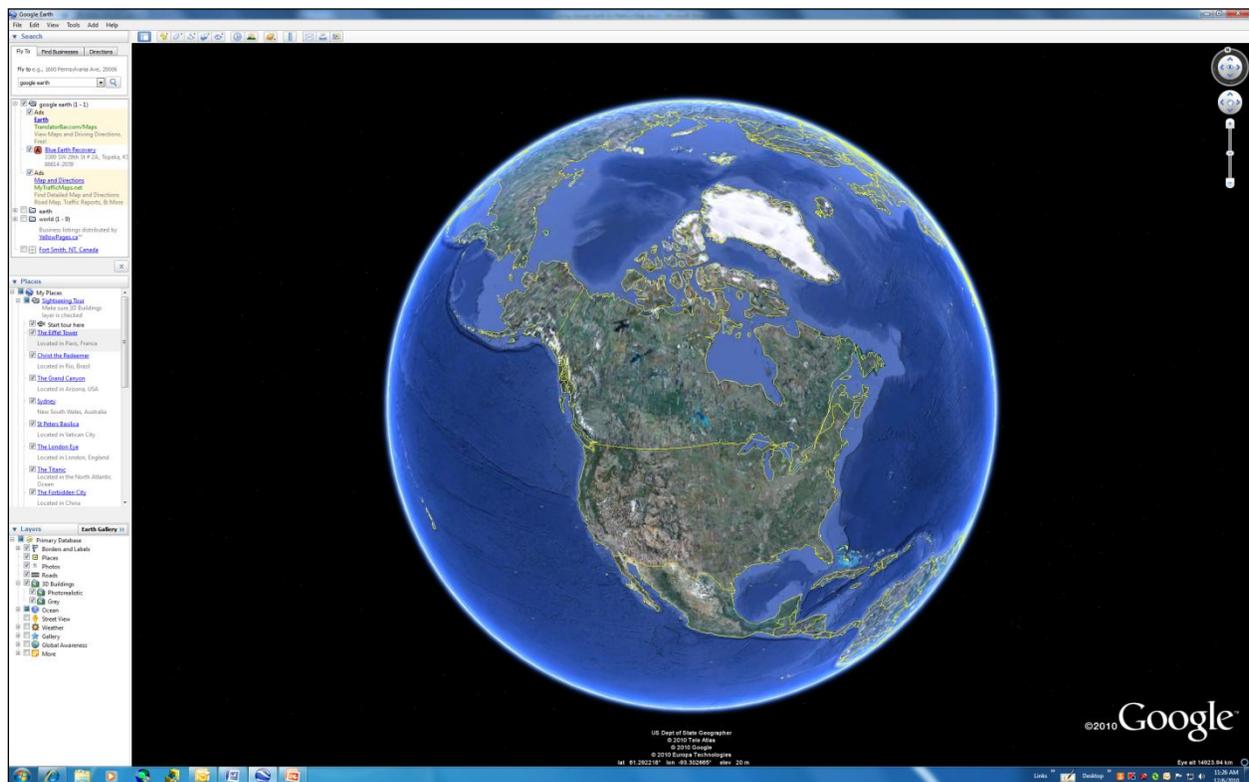
Google Earth is a software program that displays the earth's surface using satellite imagery and aerial photography. The program can be downloaded from the Internet for free. It's a very simple mapping program that you can access from any location with an Internet connection. More advanced systems are called geographic information systems (GIS). Both Google Earth and more complex GIS programs (like ArcGIS) use either a vector model and/or a raster model to display and analyze geographic information. Vector-based systems use points, lines and polygons (closed areas like a circle or a square) to create a map based on the real world. Raster-based systems use pictures in the form of grids. Grids are made up of columns and rows of cells (pixels) which have different colours to show different features like water (blue), vegetation (green) or roads (grey). Figure 1 shows the differences between the two models. Google Earth uses raster-based imagery to display the earth's surface and allows users to draw overtop of this imagery using vector-based points (called placemarks in Google Earth), lines (called paths) and polygons (called polygons).



**Figure 1.** Vector versus raster mapping models (Source: Aronoff, S. 1993. *GIS: A Management Perspective*. Ottawa: WDL Publications).

Placemarks are used to represent point features like fire hydrants, street lights or towns on a map. Paths are used for drawing linear features like roads, trails or rivers, and are made up of 2 or more points connected to create a line. Finally, polygons are enclosed areas that can be used to show buildings, forests or lakes.

When you first start Google Earth, you will see the earth from space as shown in Figure 2. To zoom in to an area of interest you can type a location into the text box on the “Fly To” tab and hit enter on your keyboard (Figure 3), and Google Earth will zoom in on that part of the globe (Figure 4).



**Figure 2.** What Google Earth looks like when you start the program.

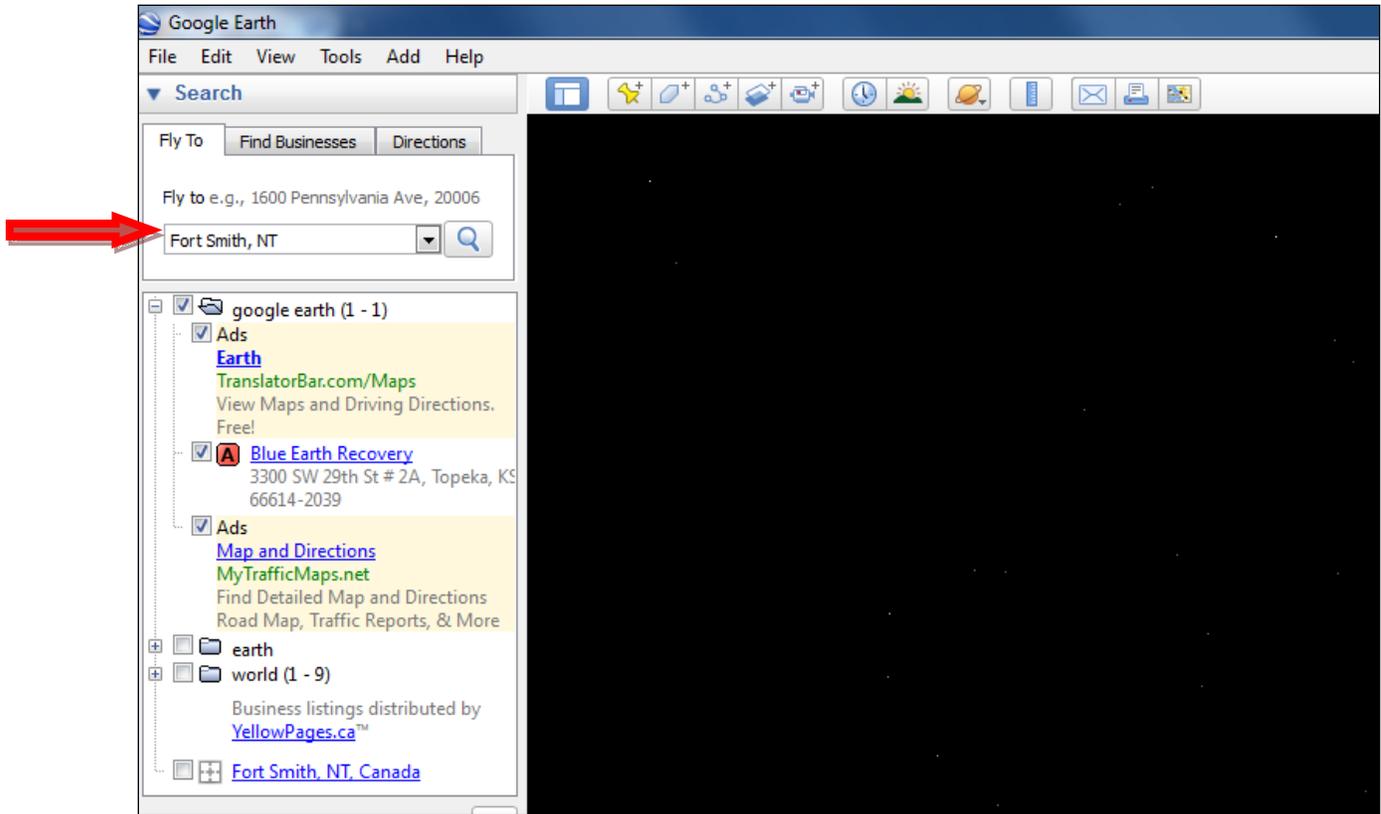


Figure 3. The “Fly To” tab with Fort Smith, NT, typed into the text box.



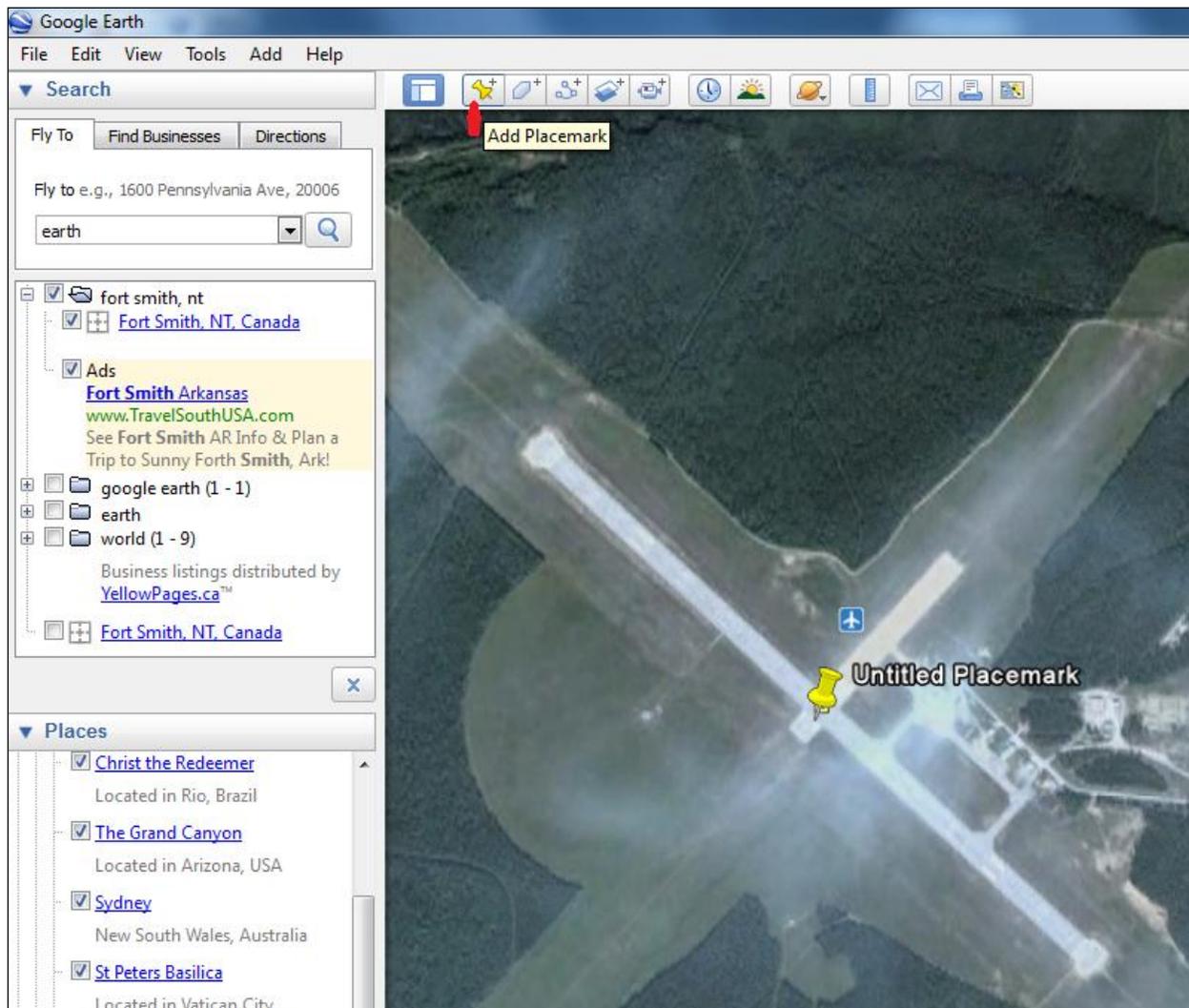
Figure 4. A zoomed in view of Fort Smith, NT. The navigation tools are shown in the upper right hand side of the screen (circled in red).

## **2. Navigating in Google Earth**

When you first start Google Earth, your mouse appears as a little hand onscreen that you can use to navigate in Google Earth. By pressing down and holding the left mouse button, you can change your view by dragging the image in any direction you like. If you double click the left mouse button over a feature of interest, you will zoom in and get an enlarged view of the area. If you double click the right mouse button over a feature of interest, you will zoom out and get an overview of the area. You can also use the navigation tools circled in the upper right hand side of the screen as shown in Figure 4. These controls allow you to zoom in and out, change your viewing angle and move in any direction (left/right, up/down).

## **3. Adding a Placemark and Changing its Properties**

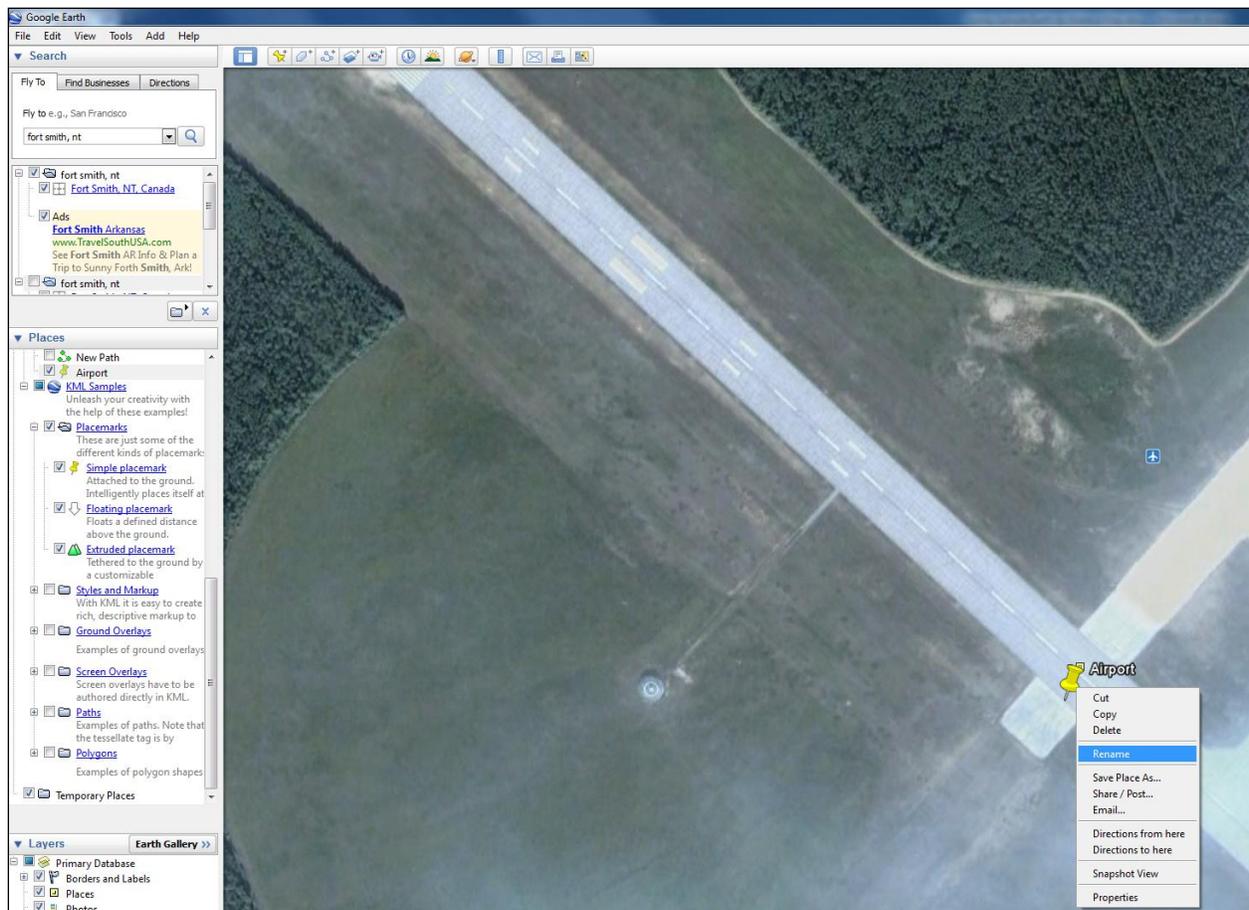
You can add placemarks by left-clicking your mouse on the icon shown in Figure 5. At first the placemark will flash, allowing you to grab it with your mouse by holding the left mouse button down. Drag the placemark to where you want it to be on the map, and then release the mouse button.



**Figure 5.** The “Add Placemark” icon (in yellow) has been used to create an Untitled Placemark on the airport runway.

If you right click on the placemark, a menu will appear. You can select the “Rename” option to give your placemark a name. In Figure 6, the placemark has been renamed “Airport”. Other menu options include:

- Cut, to remove the placemark,
- Copy, to copy the placemark



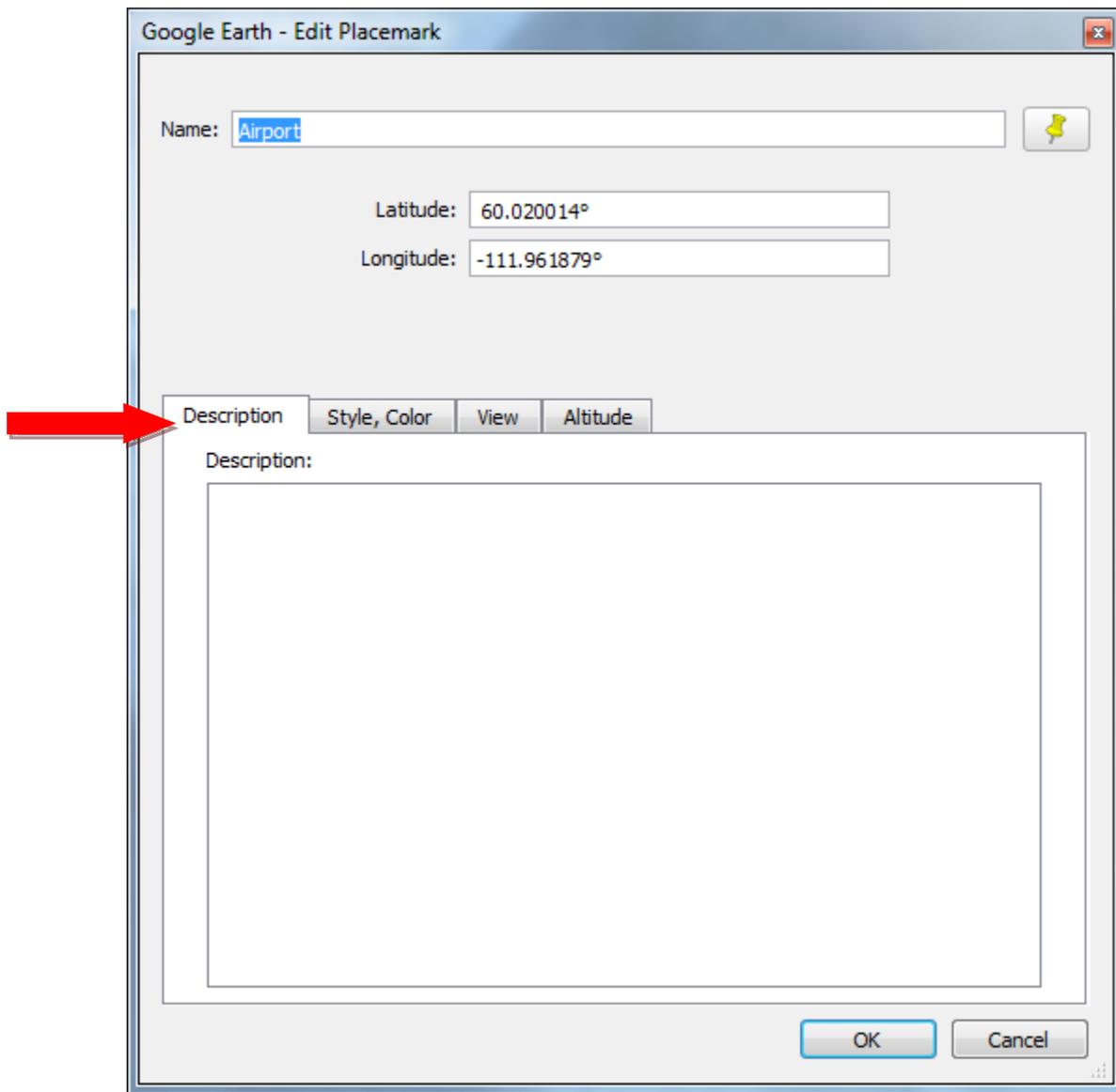
**Figure 6.** A menu will appear after right-clicking on the placemark.

- Delete, to delete the placemark,
- Save Place As, to save the placemark in a file,
- Share/Post, to post the placemark online,
- Email, to email the placemark to someone,
- Directions from here or to here, to get directions,
- Snapshot View, to keep the current view, elevation and angle, and
- Properties, to change the properties of the placemark.

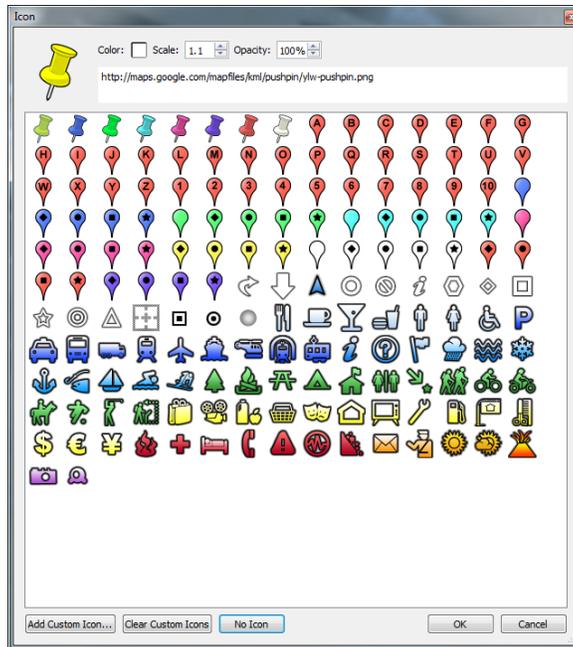
Selecting the Properties option allows you to change many details of the placemark. The dialogue box shown in Figure 7 will appear onscreen. As you can see, you can rename the

placemark at the top of the dialogue box and you can type in a description of the placemark under the “Description” tab.

If you click on the yellow pushpin at the top right-hand side of the dialogue box, you will be given a choice of which placemark to use. This is shown in Figure 8.

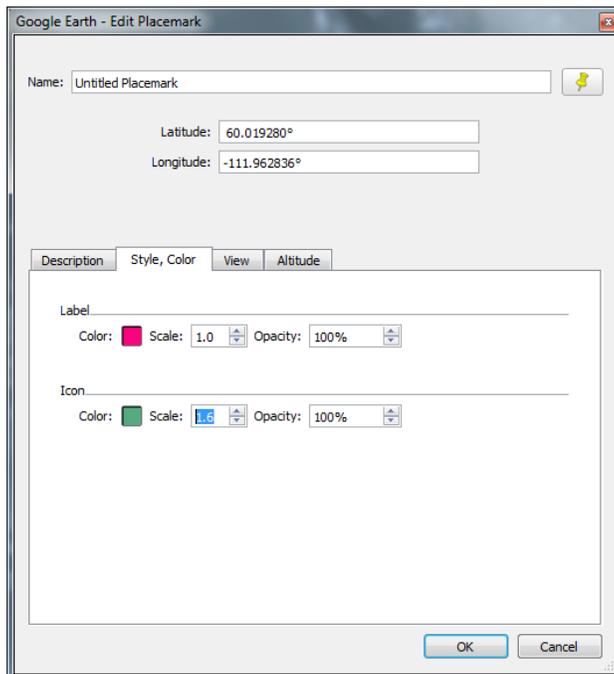


**Figure 7.** The placemark properties dialogue box.



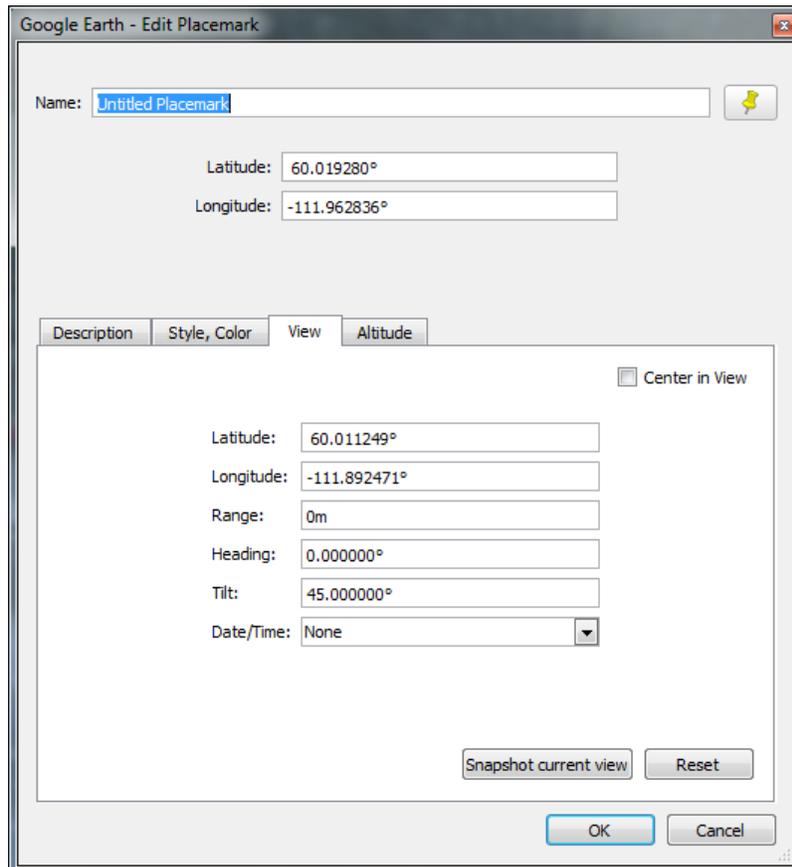
**Figure 8.** Selecting a placemark.

Under the Style, Colour tab it is possible to change the colour, size and opacity of both the placemark and its label (Figure 9).



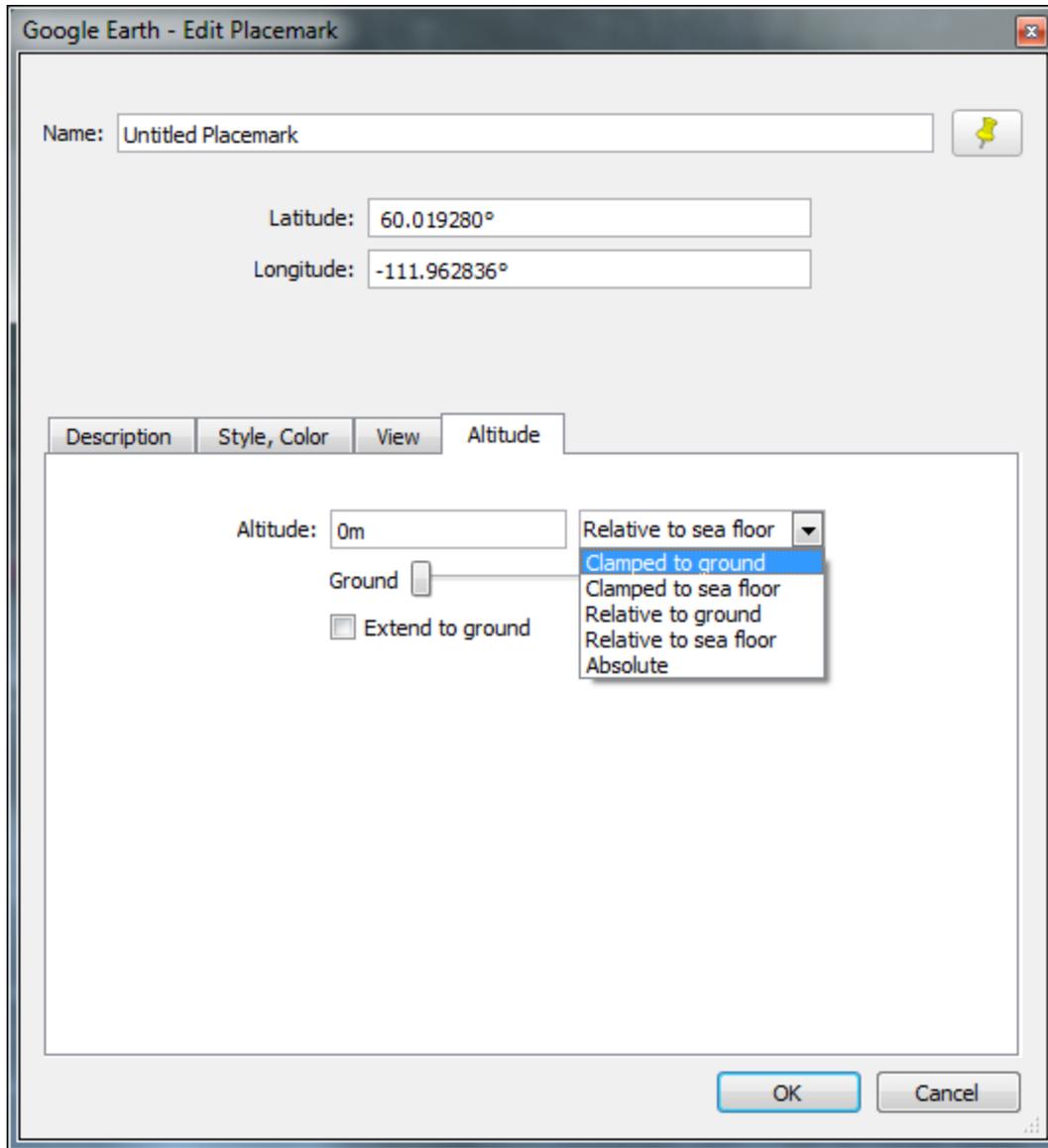
**Figure 9.** Changing the style and colour of the placemark icon and label.

Under the View tab (Figure 10), you can change a variety of settings that will change the way you view the icon. For example, if you set the tilt to 45<sup>0</sup> you will have a perspective view of the icon at a 45 degree angle.



**Figure 10.** Changing the way the placemark is viewed.

Finally, under the Altitude tab you can set the properties for the placemark so it hovers above the ground, or is clamped directly to the ground (Figure 11).



**Figure 11.** Setting the placemark altitude.

## **4. Adding a Path and Changing its Properties**

You can add a path (line) in Google Earth by selecting the Add Path icon (Figure 12). Next, click with your left mouse button several times on the map where you want the path to go (Figure 13). The path is created as a straight line between two points, so when drawing curved lines you'll need to make small changes in your cursor position to draw a curved path. Paths can be used to represent roads, rivers, routes or trails.

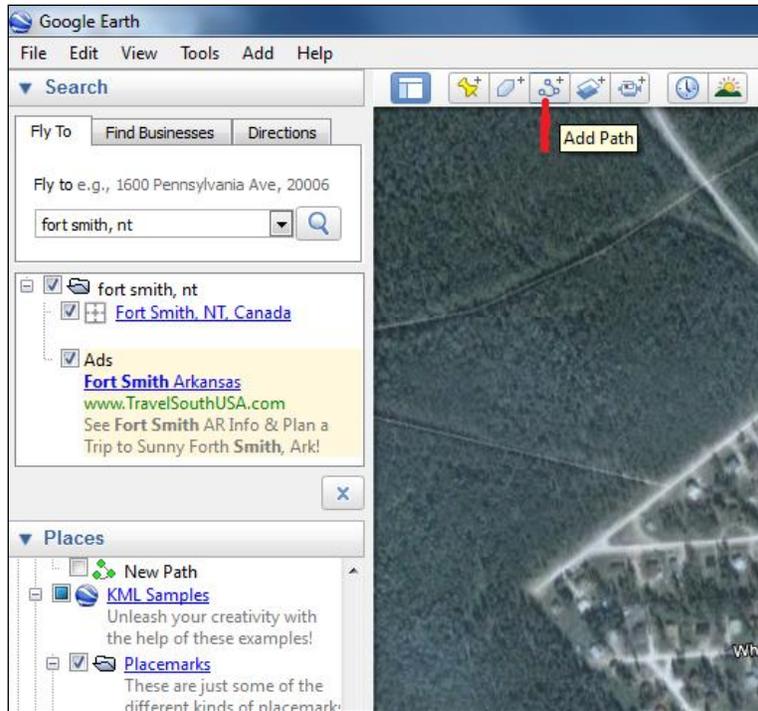


Figure 12. The Add Path icon.

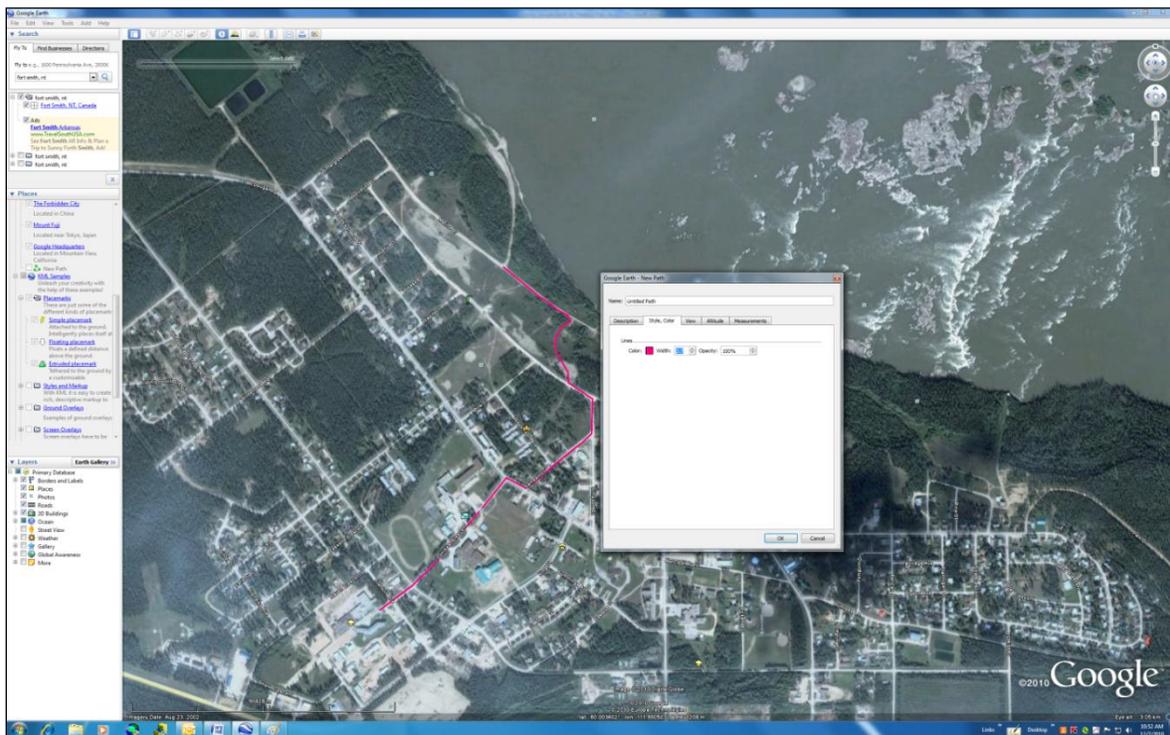
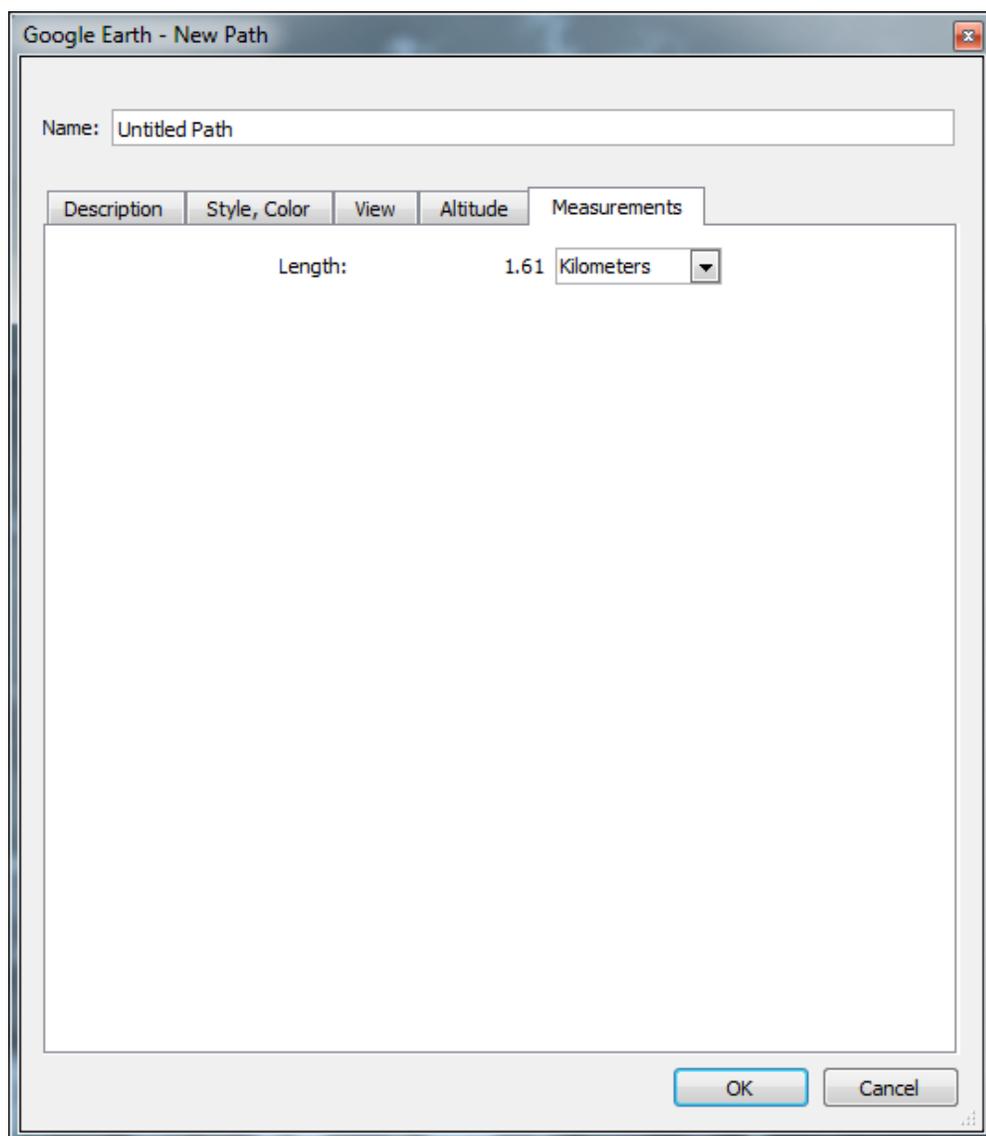


Figure 13. Drawing a path (the red line) with your mouse.

You can also change the properties of your path in the Path Properties dialogue box (Figure 14)

including:

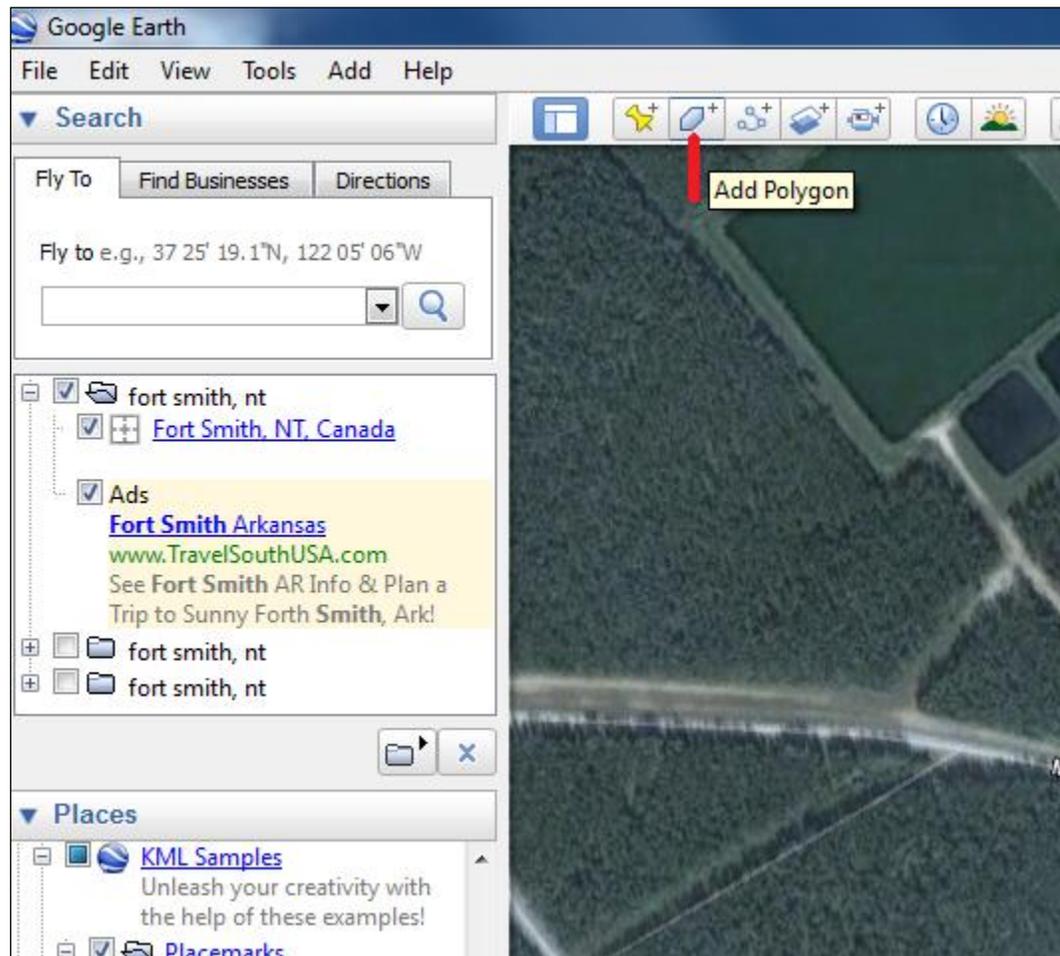
- adding a description,
- changing the thickness, colour and opacity of the path under the Style, Colour tab,
- changing the path Altitude, and
- measuring the path length.



**Figure 14.** The path properties dialogue box.

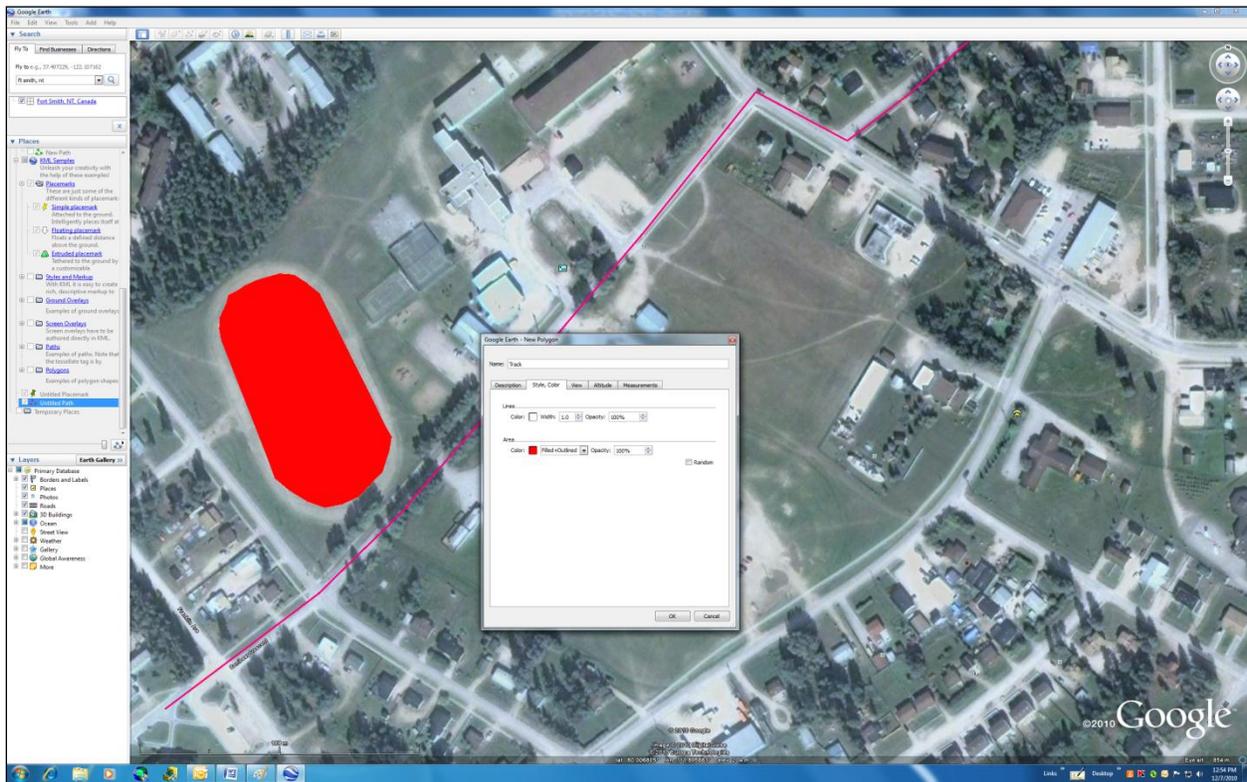
## 5. Adding a Polygon and Changing its Properties

You can add a polygon by clicking on the Add Polygon icon (Figure 15).



**Figure 15.** The Add Polygon icon.

To draw a polygon, make several left-clicks with the mouse to trace the polygon that you are drawing (Figure 16). When you come to the end of the polygon, click OK in the polygon properties dialogue box to finish the drawing.



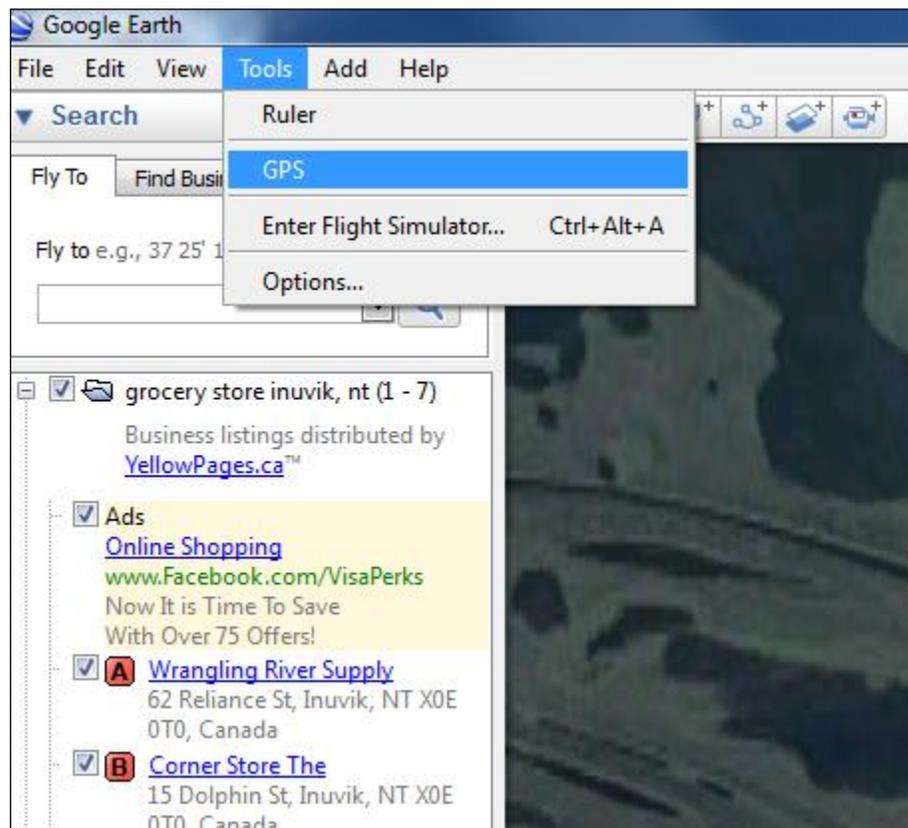
**Figure 16.** Drawing a polygon (red area).

Like paths and placemarks, polygons have a properties dialogue box that allows you to:

- add a description,
- change the line width, colour and opacity, and the area colour and opacity, under the “Style, Colour” tab,
- change the altitude of the polygon, and
- measure the perimeter and area of the polygon.

## 6. Downloading Global Positioning System (GPS) Data for Display in Google Earth

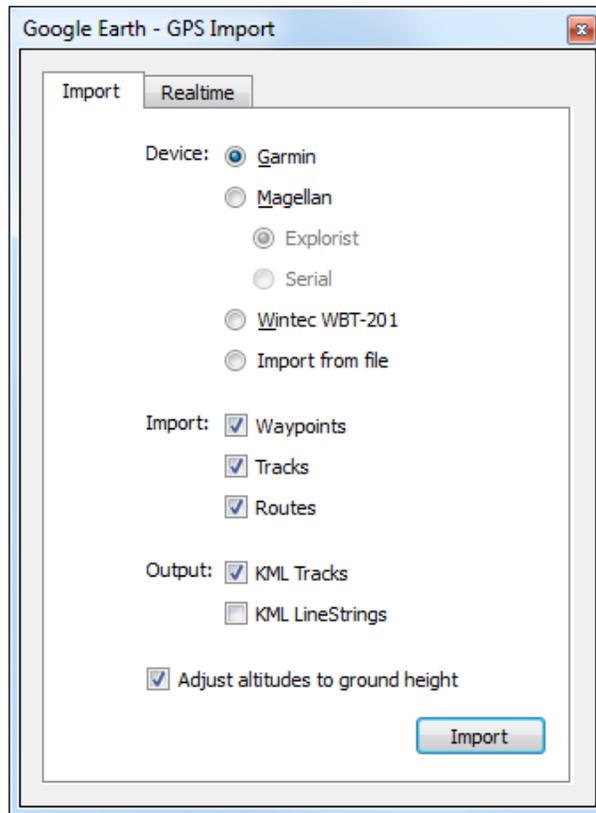
You can download GPS tracks and waypoints and display them in Google Earth. To begin, you'll need to connect your GPS unit to your computer. Next, left-click on the Tools drop-down menu and select "GPS" (Figure 17).



**Figure 17.** Selecting GPS from the Tools drop-down menu.

The GPS Import dialogue window opens as seen in Figure 18. Here, you need to select the GPS type that you have, select which items to import (waypoints, tracks or routes), and select the output type (KML tracks or KML linestrings). KML tracks have a time associated with each

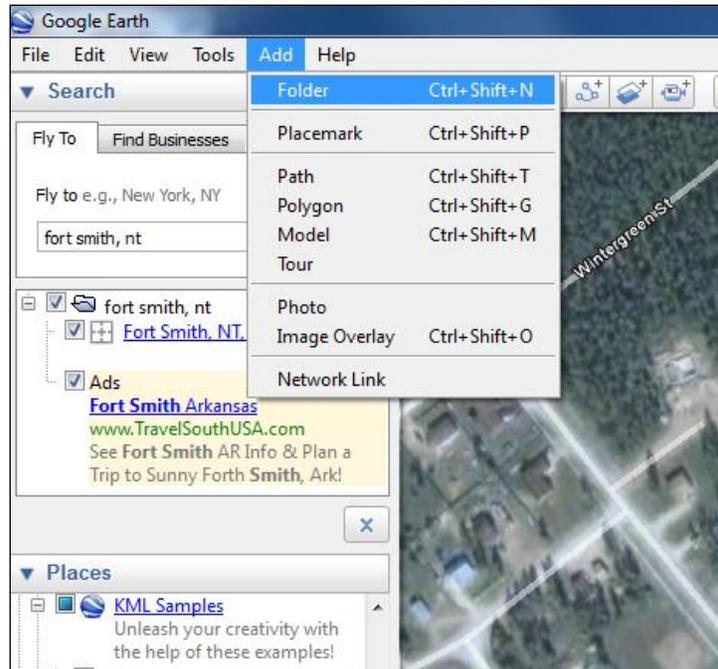
point. KML linestrings are used if you want to import the linestring into other KML viewers like Google Maps.



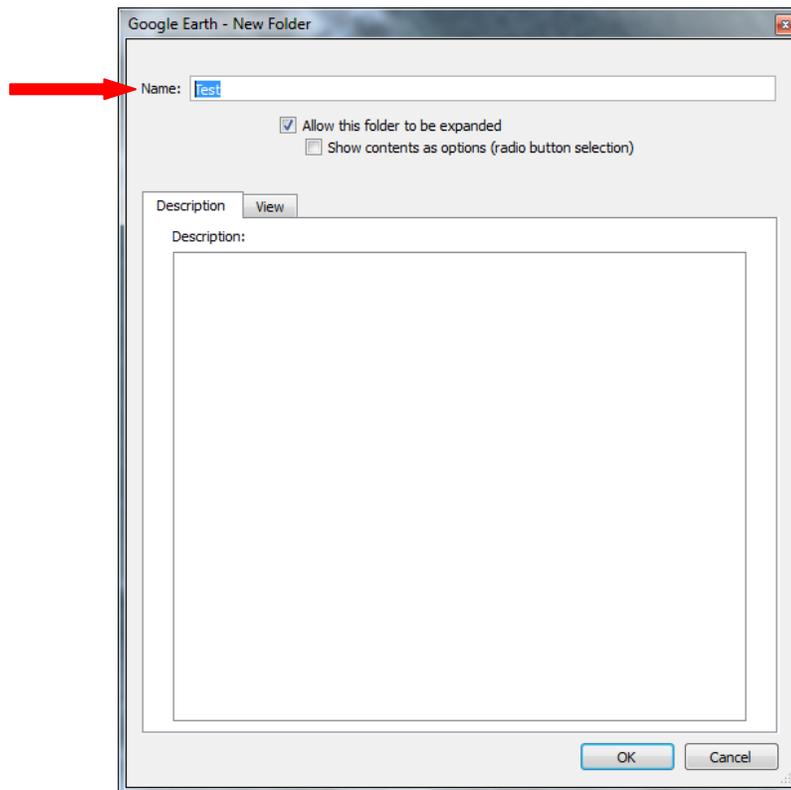
**Figure 18.** The GPS Import dialogue window.

## 7. Exporting/Importing Google Earth KML/KMZ Files

It is easy to save your placemark, path and polygon files by putting them in a folder. To create a folder, left-click on the Add drop-down menu and select Folder (Figure 19). A dialogue box appears and you can name your folder (Figure 20).

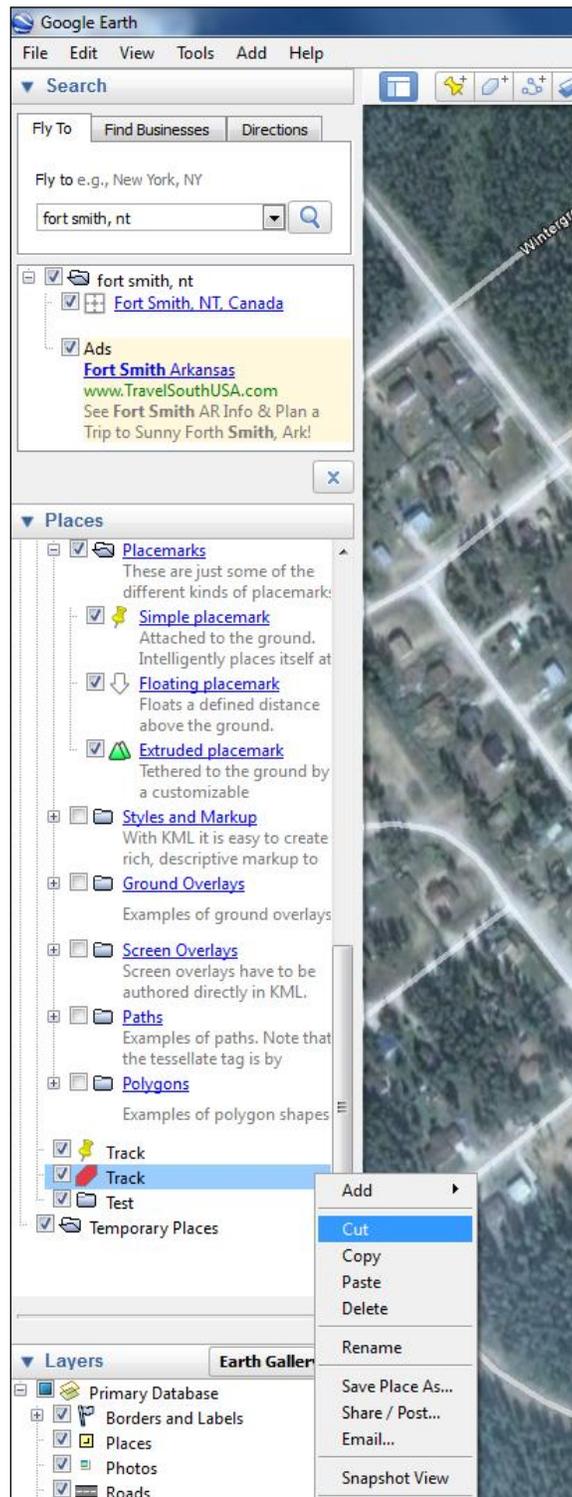


**Figure 19.** Adding a folder for your placemark, path and polygon features.

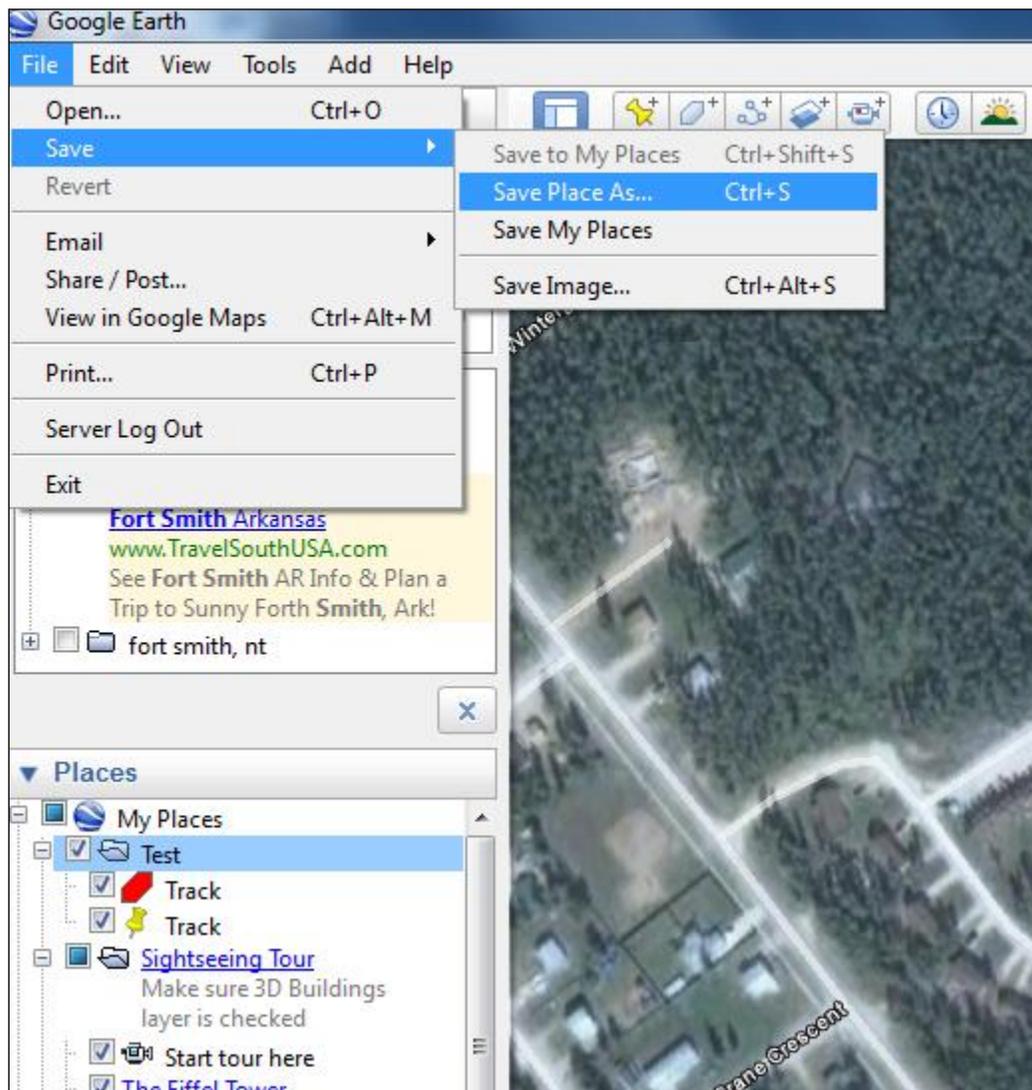


**Figure 20.** Naming your folder.

In the Places section (Figure 21), you can move your Track polygon and Track placemark by individually cutting and pasting them into a folder. To cut the track polygon, point at it, right-click and select Cut from the menu. Next, right click on the Test folder and select Paste from the menu. Do the same for the track placemark. Once you have all of your features in one folder, you can save them as a KMZ file that you can email to friends and family for them to view in Google Earth. To save your folder (or placemark, polygon or path), highlight the folder or file, click on the File drop-down menu, point to Save and then left-click on Save Places As (Figure 22). To open/import a KML/KMZ file in Google Earth, left-click on the File drop-down menu, select Open, and pick the file you want to open.



**Figure 21.** Moving (Cut) your Track polygon and Paste it in your new Folder called Test.



**Figure 22.** Select Save Places As to save your highlighted folder as a KMZ file.

## 8. Copying Your Map and Pasting it into Another Document

If you want to include your map in a report you can copy and paste it into your document. First, ensure that you have zoomed in on your map as much as possible. Then, under the Edit menu, select Copy Image. Next, position your cursor where you want to insert your map, hold down the control (ctrl) key and press the v key.

## 9. Exercise

- Make a map that shows features in your town (like the grocery store, bank, houses, schools, roads) and natural features (like forests, rivers, and lakes).
- Draw 4 polygons around the following: your house, the bank, the post office, the school.
- Draw 4 paths showing the way from your house to the bank, the grocery store, the post office and the school.
- Insert 4 placemarks showing the locations of 4 different community features.
- Change the properties of your polygons, paths and placemarks.
- Move your polygon, path and placemark features into a folder called Exercise 1.
- Save your Exercise 1 file folder as a KMZ file.