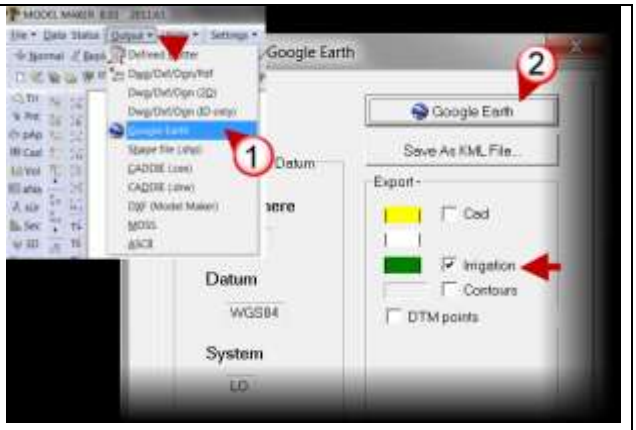
MMS DESIGN
Survey & Engineering Solutions

How to shift and rotate old projects to Google Earth co-ordinates

When I started to think about this feature and how I can use Google Earth data to move and rotate data in Model Maker, I realized that the methods explained in my previous article, where I used GPS co-ordinates for positioning, the same logic can be applied using Google Earth place marks, although not as accurate, but accurate enough for presentation purposes. The methods explained left very little room for error and can be applied to many data types (irrigation, points and CAD) all at once.

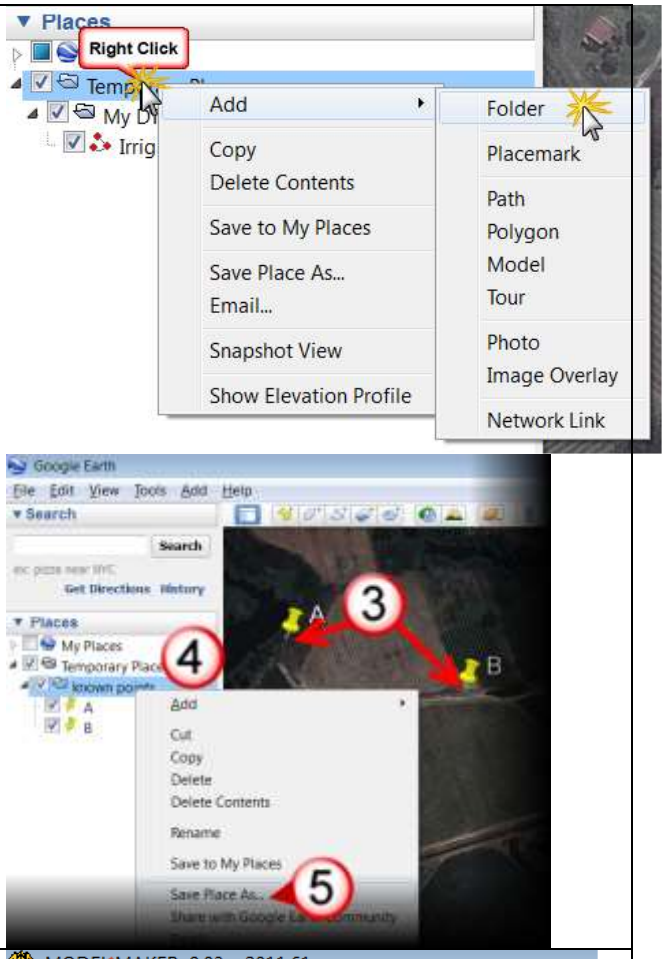
Let's assume you have various designs and surveys over time, but each one in it's own Model Maker file. Some of them may be very recent and based on survey methods like using a modern day GPS system and others are based on surveys done with a total station or even a theodolite with a staff. Chances are that the older surveys are on a local co-ordinate system and not properly north-south rotated. The problem comes in when you need to show all the designs on one drawing. The fact that different survey methods and co-ordinate systems were used does not make the designs wrong or inaccurate. The designs may be very accurate based on the survey data for the time, but the positioning on the earth and elevation datum may be way different for each file. This is where Google Earth is yet again a perfect tool to assist the designer to graphically identify known points in Google Earth imagery and use it to match the different files. So armed with the knowledge of my previous article we can join different data files into one as follows. (Download my previous article here: http://www.mmsdesign.co.za/manuals.htm)

Step 1: Start with your latest design file that is properly orientated with the correct GPS co-ordinates. Let's call this the NEW design. Export it to Google Earth using OUTPUT (1) Google Earth in the main menu. Set your desired outputs, check your co-ordinate system and click the Google Earth button (2). This will send your design to Google Earth. We can now use this layout in Google Earth to assist us in finding known points in the older file survey to be used in step 2.	

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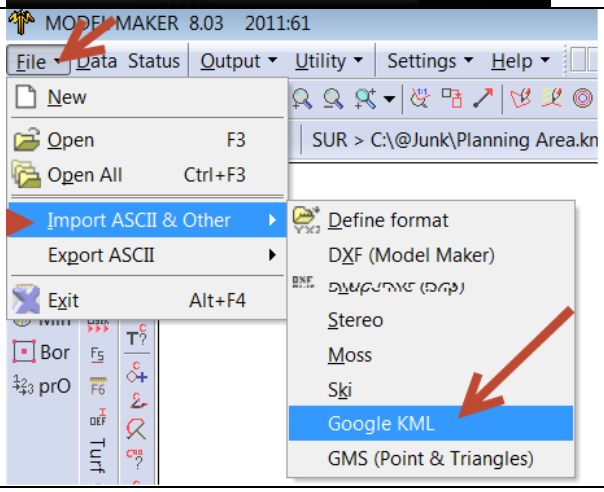
Step 2: In the Temporary Places section, right click and add a new folder called "Known Points". Locate two known positions like building corners, valve position, intersections of roads etc. two known points that you have surveyed in the old files in your **LOCAL SURVEY**. Place two place marks (3) as accurately on the photo as possible. Right click the places folder (4) containing the two place marks and save place as **KML** file (5).

Tip: we use two points so that we can perform a rotation if needed. If your survey is already north rotated, you can work with only one point because a rotation will not be necessary.



Step 2: Open your existing design data (your **LOCAL SURVEY**) in Model Maker, then import the KML file into Model Maker by combining the data. You will probably find that the KML data points plot very far from your design data, so you will need to zoom somewhat to find everything.

Tip: A quick way to find points on the screen is to switch on the display of DTM point elevations.



Step 3: Refer to my previous article to determine the DY DX and DZ differences. In this case the place mark points represent the GPS co-ordinates in my previous article. Follow the steps of my previous article and apply the shift on all the **local** survey data in the file. Save the design file/s. For this tutorial I used MIR and TOT files, but you can use MAL files as well.

Step 4: Combine the old with the new by simply opening the files and adding them to each other using the File > Open dialog. Make sure the Add file to data (6) tick box is selected when opening new files. **Tip:** If you are working with TOT files do the following, when prompted if you want to Add or replace TOT data, select Add. This will combine the survey data from both files into one. I suggest you restart triangulation at this point to avoid possible triangle errors.	
Step 5: Merge the irrigation projects. At this stage you will see that Model Maker did not automatically merge the irrigation projects into one but kept them separate (7). If both projects have a main line, each with a pump (could be the same pump but duplicated in each project), I suggest that you pick a master project and delete any duplicate nodes or pipes out of the other project. Copy the other project into the master project (8) to make one final project. You may want to delete the other project when you are done. Repeat this process as many times as needed to create one final master of all the work done on a farm.	