

PROJECT INFORMATION SHEET

OBJECTIVE: The purpose of this semester project is for you to gain some more experience in using GPS equipment in the field and GIS software in the lab. The project breaks down into 4 steps:

1. Obtaining an air photo backdrop from Google Earth Pro for your GIS map.
2. Using a GPS receiver to map an assigned parking lot on campus (see Appendix 1 for mapping assignments).
3. Registering the air photo image.
4. Using MapInfo Pro software to create a GIS map of your parking lot showing area and perimeter.

OVERVIEW

The sections below provide an overview of the project. Details can be found in the attached Project Tutorial. The tutorial contains some detailed step-by-step guides, covering some new procedures, and also some not-so-detailed steps, covering procedures we have already done in the labs.

AIR PHOTO BACKDROP

Either before or after field mapping, you must create an air photo back drop for your map. You can obtain an aerial photo image from Google Earth Pro, but it will not be registered. You will register your image using the image registration procedure in Map Info Pro (see lecture 6).

GPS MAPPING

You will use a Garmin hand-held GPS receiver. Field data collection must be completed in the weeks of April 1-5 and April 8-12. Sign up in the Geography office (EESAT 210) to reserve a GPS receiver. You can sign up for 9-10.30, 10.30-12, 1-2.30, 2.30-4 (Note: three people can sign up for each time slot). You can only sign up for one time slot. When you take a GPS receiver, you must leave your student ID in the Geography office. Please take every precaution not to drop the receiver or leave it unattended. Please return the equipment to the office on or before the end of your time slot. It will be a good idea to "walk through" the mapping exercise prior to taking out the receiver. To simplify and expedite the project you will write down point coordinates, rather than store them on the Garmin (you only need to map a small number of points, probably in the range 10-20). The "satellite screen" has a longitude and latitude display. You will also map separately entrances/exits to your parking lot. You will map the outer perimeter of the parking lot – if it wraps around a building, you do not have to map the inner perimeter). A long straight segment of perimeter can be recorded by one point at the beginning and one point at the end. Minor details (e.g. small indents, small curves) can be ignored (treated as straight segments). A clipboard is highly recommended.

GIS MAPPING

You will create two excel files – one for points collected along the perimeter of your parking lot and a second for points representing access to your lot (entrances/exits). In Map Info Pro you will create points for each file (see lab 6). To better show your parking lot, you will use perimeter points to create a polygon with a red fill (color). You will also identify access points by a blue “stop-sign” symbol. In Map Info Pro you will use the “get info” button to find the area of your parking lot in square meters. Send your finished project to me as an email. Attach the following: excel file 1, excel file 2, image of your parking lot showing red perimeter with no fill; image of your parking lot with red fill; image of your parking lot with *Info Window*. Put your initials in all file names.

Written answers (attach as WORD document):

1. Describe difficulties you encountered when completing this project.
2. What evidence of error did you find?
3. Describe three situations where this level of mapping accuracy would be appropriate.
Describe three situations where this level of mapping accuracy would not be appropriate.

APPENDIX 1: MAPPING ASSIGNMENTS

* see campus parking map (link on class web page) for parking lot locations.

Alsobrook, Alyssa Ryanne	1 A
Bradshaw, Ethan Linden	2 A
Burchett, Logan R	3 A
Chaney, Reid Alexander	4 A
Cowdrey, Reagan	5 V
Dotson, Naima A	7 RR
Edmisten, Paige Alyssa	8 A
Fritsche, Austin Joseph	10 FS
Guinn, Scotty Cole	9 FS
How, Rachel	11 FS
Jones, Joshua C	12 N FS
Juarez, Maria I	12 S FS
Land, Emma Mackenzie	14 RR
McClure, Connor Jones	15 RR
Merrill, Kade Alan	16 V
Nelson, Logan M	17 RR
Ricks, Benjamin W	27 FS

AIR PHOTO BACKDROP.

For this tutorial I will work on parking lot 9 near the EESAT building (Fig. 1). Follow these steps to create your air photo backdrop: 1. In Google Earth Pro, zoom in to campus and find your parking lot. Check that north is towards the top of the view. Change the zoom and pan until your parking lot is in the center and the image extends at least a block in all directions (Fig. 1).

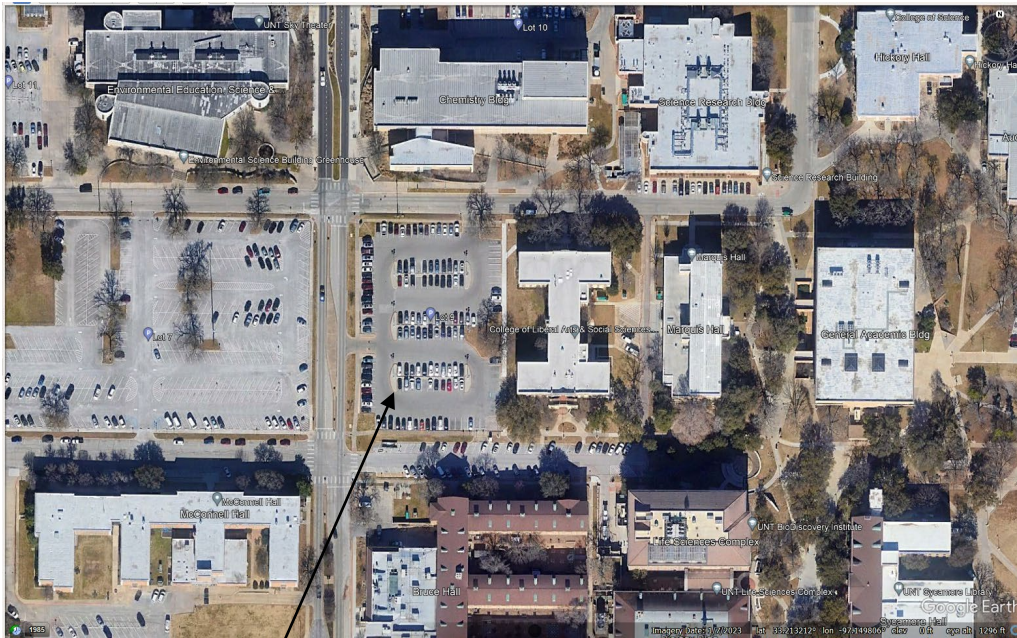


Fig. 1. Parking Lot 9.

Click on *File* | *Save* | *Save Image* to save this image to your project folder. Save the image as your *initials_airphoto.jpg* e.g. *hw_airphoto.jpg*). Open your project folder, right-click on the image and select *Open with Photos*. Click on *Edit Image*, click on *Crop* and crop the image to remove unwanted areas from the image (so your parking lot is in the center and the image extends about a block in all directions) (Fig. 2).



Fig. 2. Cropped image of parking lot 9.

REGISTERING THE AIR PHOTO BACKDROP

Use Google Earth Pro to obtain four Ground Control Points (GCP) surrounding your parking lot. Street intersections usually work well. Record these locations in decimal degrees. Note that longitudes are negative (west) and latitudes are positive (north). Start Map Info Pro. Select *Open Table*. Navigate to your project folder. Find your image under *files of type, raster images*. Open your image (Fig. 3).

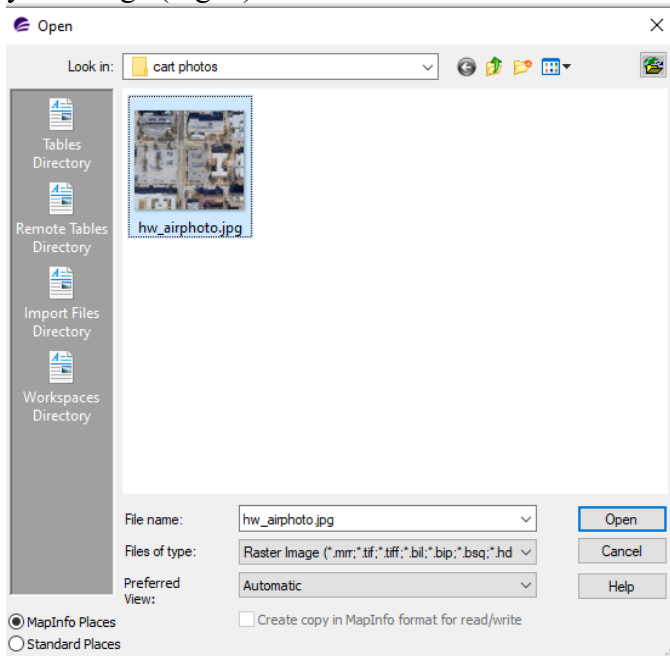


Fig. 3. Opening the air photo image.

This question will pop up (Fig. 4): Click on *Register*.

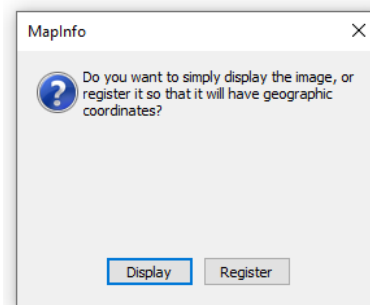


Fig. 4. Opening raster image.

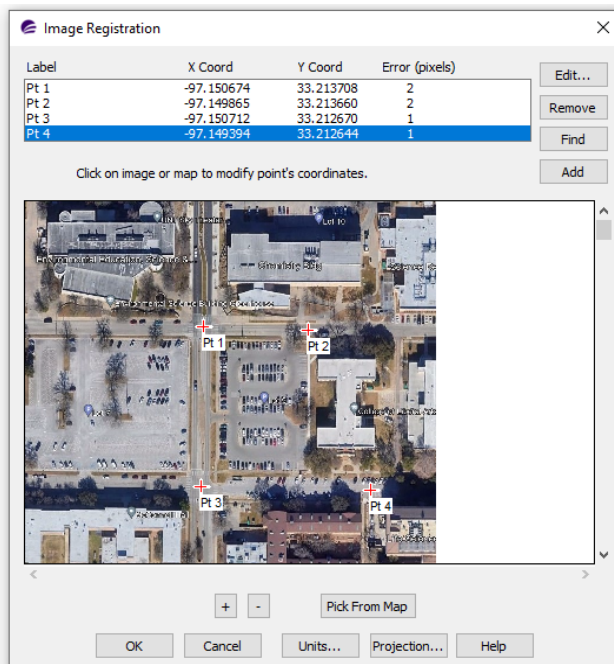


Image Registration: Click on GCP and enter coordinates. X is longitude, Y is latitude. **After entering coordinates for each point, click on add.** Check that Projection is Latitude/Longitude WGS 84 (Fig. 5).

Fig. 5 Image Registration.

Click *OK*, the registered image will appear in a map window.

GIS MAPPING

Create two excel files – one of perimeter points, a second of road access points (Fig. 6).

1	CART PROJECT 2024 PARKING LOT 9		
2	POSITION	LATITUDE	LONGITUDE
3	1	33.21360	-97.15056
4	2	33.21360	-97.14986
5	3	33.21323	-97.14985
6	4	33.21324	-97.14993
7	5	33.21320	-97.14992

1	2024 CART PROJECT ACCESS POINTS LOT 9		
2	POSITION	LATITUDE	LONGITUDE
3	A	33.21362	-97.15006
4	B	33.21315	-97.15052

Fig. 6. Excel files.

In Map Info Pro, set coordinate units to degrees, distance units to meters and area units to square meters. Open both files in Map Info (see lab 6 if you need a reminder on how to do this). Create points for both files (see lab 6). Note: in lab 6 we used UTM coordinates, in this project we use decimal degrees (see Fig. 7).

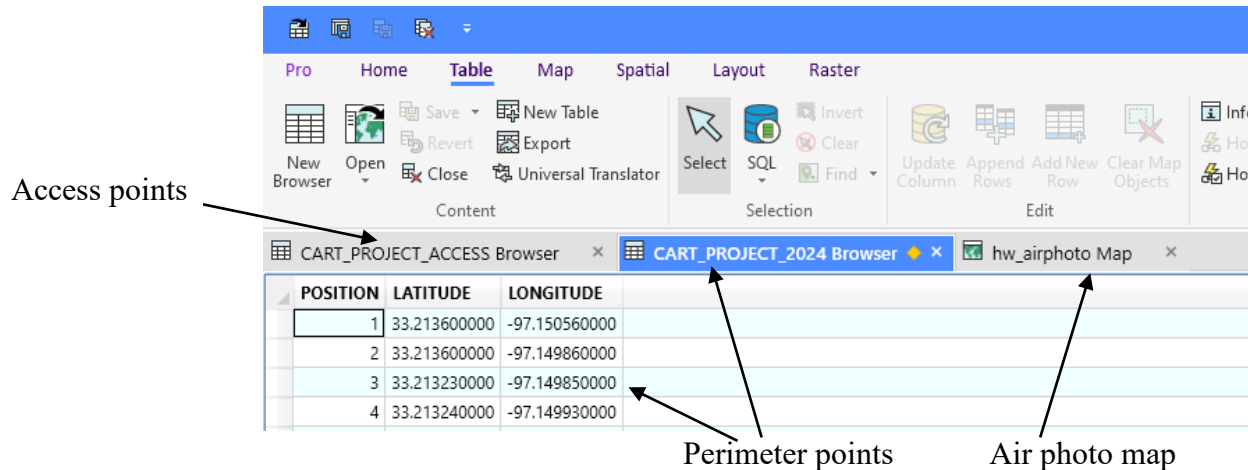
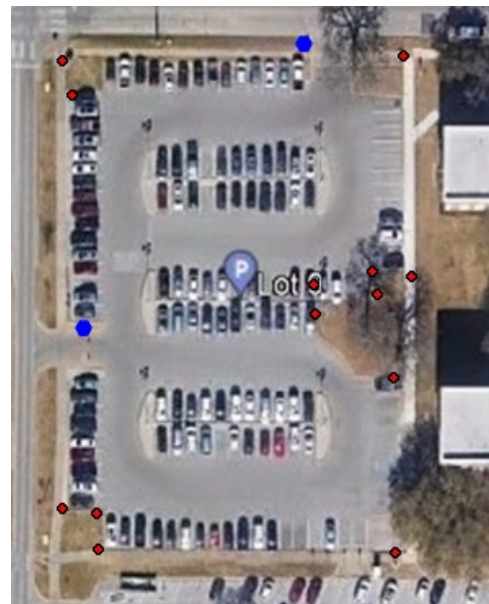


Fig. 7. Tabs - two excel files and the air photo in MapInfo.

Use the Create Points procedure to add points from both files to the map (see lab 6). Make perimeter points 7-point solid red circles and access points 10-point blue hexagons (MapInfo Cartographic font) (Fig. 8).

Fig. 8. Perimeter points and access points on the map.



CREATING A POLYGON FOR YOUR PARKING LOT

For simplicity, you will use the Map Info polygon tool to “join the perimeter dots” and create a polygon covering your parking lot. We need a place to put the new polygon – that place will be the cosmetic layer. The cosmetic layer must be made editable by clicking the pencil icon (Fig. 9).

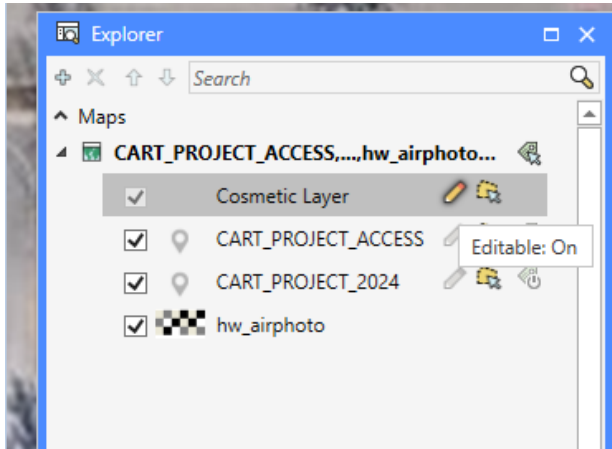


Fig. 9. Making the cosmetic layer editable.

Under *Map| Insert* click on *Polygon*. Click on first point, drag mouse to point 2, click on point, and so on (“join the dots”). When you get close to where you started (~20 feet), double-click to close the polygon. Click on *Map| Cosmetic| Save cosmetic object*, name the object *Polygon*. The polygon layer should appear in the Explorer window. Make the polygon layer editable. Right-click on the Polygon layer and give the polygon no fill and a thick red border (Fig. 10).

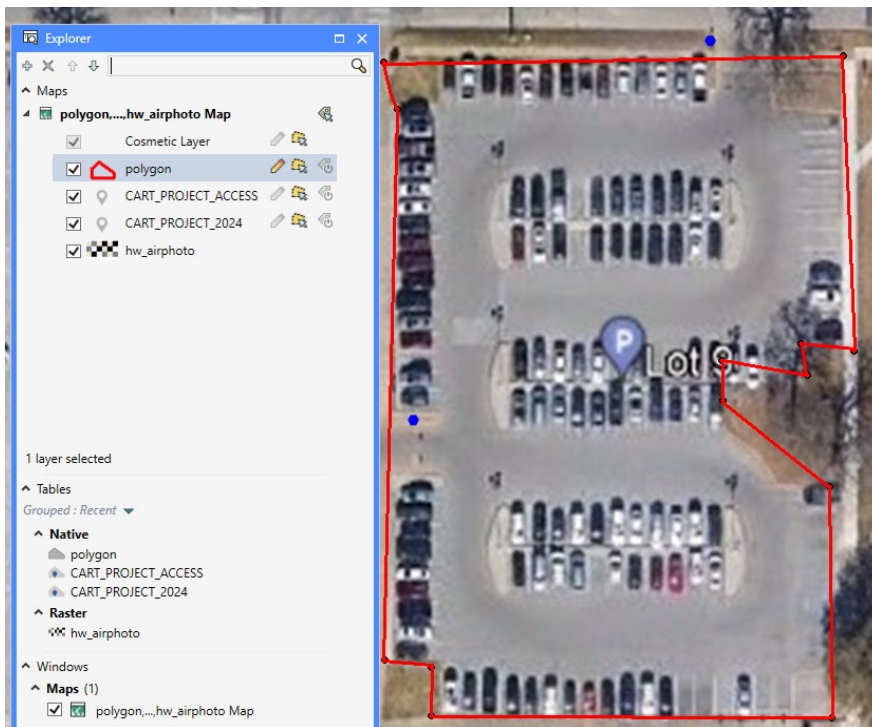


Fig. 10. Polygon perimeter.

Save an image of your parking lot that you will email to me (use Home| Save Image). Click on the selection arrow. Right-click on the polygon layer in the Explorer window and click on Layer Properties. Give the polygon a red fill (color). Save this image to email to me later. Click on the polygon with the selection arrow – it will become selected (changes color). Now right-click on the polygon and select *Get Info*. A window appears showing area in square meters and perimeter in meters (Fig. 11). Save this image to email to me (should look similar to Fig. 11).

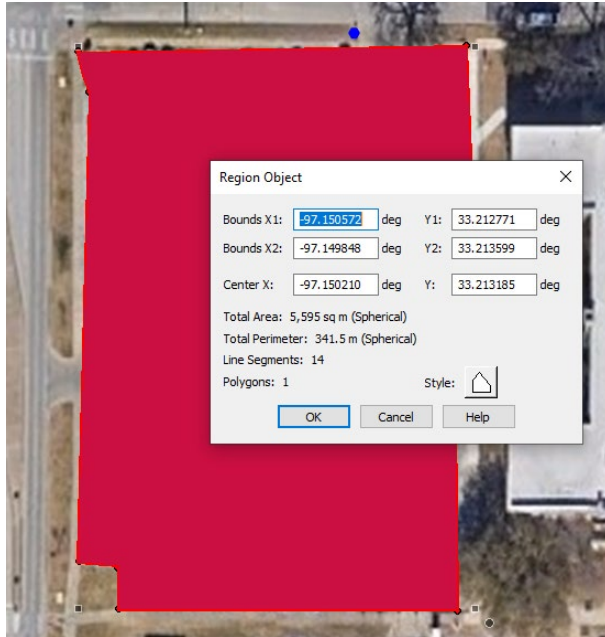


Fig. 11. Info window for polygon.

To complete the project email to me the following attachments: excel file1, excel file 2, image of your parking lot showing red perimeter with no fill; image of your parking lot with red fill; image of your parking lot with Info Window. Include written answers in an attached WORD document. Deadline – April 30th 2 pm.