Exercise 3: Autonomous Mapping with Map Series

GEO 352/592M Fall 2023

Tuesday / Thursday 1:00 – 2:15pm Morrill 212

Hello! My name's Avery Panza. I taught this course for 2 years during my graduate career at UMass Amherst. I graduated in 2022 with a MS in GIST and now work as a GIS database specialist (DOD contractor) for the US Navy on Guam US Territories.

In this exercise, I'll be going over an awesome computer mapping skill called a **Map Series** which I use frequently as a fast-mapping solution when I have a ton of simple maps to make. To note, the shapefiles you'll be using today are full of dummy data. My work involves mapping several classified installations and working with data that requires special clearances. You will be working with maps of Guam that are publicly available and I encourage you to zoom into the naval port (Naval Base Guam) as well as Andersen Air Force Base to see if you can find some cool stuff like fighter jets or submarines.

Enjoy…

1. Getting Started

a. OK, when we open ArcGIS Pro and create a new map, we want to **save the project/folder location directly your drive.**
b. Check the box that says create a new folder for this map document and direct it to a place on your hard drive or flash drive.
c. Name your project "Map Series Lab" (or something like this)

2. Set Map Projection

a. In the Contents Pane on the left, right click **Map** and open **Properties**.
b. Navigate to the **Coordinate Systems Tab.**
c. **Search** for and select **WGS 1984 UTM Zone 55N**
d. Click OK. You'll notice that this map projection is appropriate for Australia, the Philippines, Japan and Guam.

3. Switch Basemaps

a. In the Map Ribbon, **expand Basemap and select "Imagery".**
b. Next, find and zoom into Guam (right in the center of your map, very close the Marianas Trench). If you have trouble finding it, you can try searching for Guam.
    i. Map Ribbon → Inquiry → Locate.

4. Download Exercise Data

a. Save and unzip the exercise data into your project folder.
b. Tip: I like to create a folder within my project folder for my data. If you do this within your project folder, you won't have to add a folder connection in Catalog to access it.

5. Rename Your Map and Add Data
    a. Below "Drawing Order", right click on "Map" and open properties.
    b. In the "General" tab you'll see a text option called "Name". **Please rename your map to "Inspection Sites"**
    c. Next add the following shapefiles to this map.
        i. Inspection_Sites
        ii. Guam_Ocean

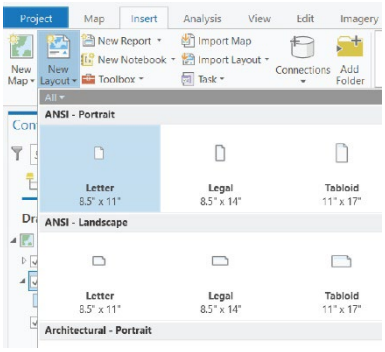
6. Inspection Sites Map Symbology
    a. The last thing we're going to do with this map is symbolize our layers. Right click each layer, open Symbology, and set the following color scheme.
        i. Inspection_Sites
            1. No fill
            2. Red outline of 1 or 2 (you can adjust it later if it looks off)
        ii. GU_Ocean
            1. From Gallery = "Water (area)"

    That's all with this map for now. We'll come back to it later.

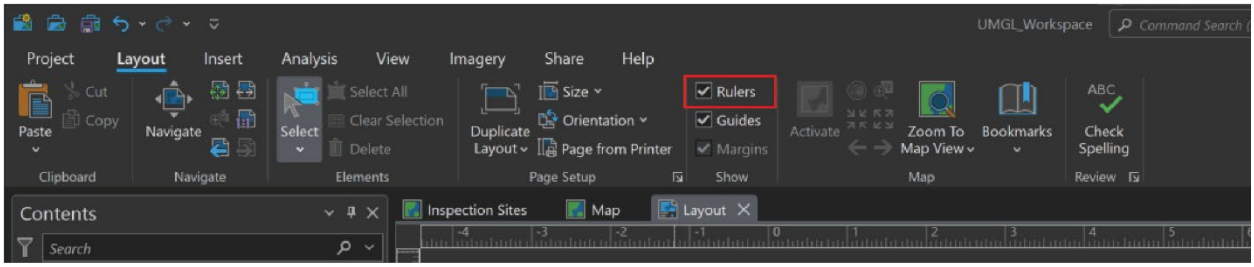
7. Create New Map (for extent map)
    a. In the "Insert" tab, click on "New Map" to create a new map document within the project.
    b. **Please rename the map to "Guam Extent Map"** and set the maps projection to **WGS 1984 UTM Zone 55N**
    c. The extent map does not require a basemap. Instead, we'll create our own map.
    d. Add the following shapefiles to Guam Extent Map: (in this order top to bottom)
        i. Runway_For_Extent_Maps (I made this as a reference)
        ii. GU_Ocean.shp
        iii. Military_Land.shp
        iv. Guam.shp

8. Guam Extent Map Symbology
    a. Right click each layer, open Symbology, and set the following color scheme.
        i. Runway_For_Extent_Maps
            1. 30% Grey Fill
            2. 80% Grey outline at 0.1 width.
        ii. GU_Ocean.shp
            1. From Gallery = "Water (area)"
        iii. Military_Land.shp
            1. Grey 20% fill.
            2. No outline
        iv. Guam.shp
            1. From Gallery = "Park"

9. Create a Layout
    a. In the Insert Ribbon, select New Layout → Portrait Letter. This creates a new print layout file.
    b. The first thing you'll need to do is insert your map frame. While in Layout, at the top of your page there is an option for Map Frame. Open this, and select the "Inspection Sites" map frame. Now, draw a rectangle which will become the map area of your page.



        i. Its important to note that the map frame boundary is not the neatline, but it can act like one! You can choose to edit or turn off the outline of your map frame by right clicking and choosing properties. **For this assignment we'll use the map frame outline as our neatline for the top half of our map.** It is important to make sure your line thicknesses match across your entire map.
    c. Top of Layout:
        i. **Draw or adjust your map frame so that it is precisely ½ inch from the top, left and right edge of your page. 2 ½ inches from the bottom of your layout page.**
        ii. You can use the ruler to make this adjustment. If your ruler is not enabled, please enable it by going to Layout -> Show -> Rulers (toggle on/off)



    d. Bottom of Layout:
        i. **Start by inserting a rectangle ½ inch from the bottom, left and right edge of the page. The top of this neatline will go 2 ½ inches from the bottom of the page.** You can find the rectangle in Insert -> Graphics and Text -> scroll unitl you find rectangle (not a textbox). It should look like a box at the bottom of your layout which will fram our map elements.
    e. Service Layer Credits:
        i. With the map frame selected, Click on Dynamic Text from the insert tab and scroll until you find "Service Layer Credits". Choose it, this will now let you draw a text box for your service layer credits.
        ii. Draw this box completely off of your layout page. We don't want this information anywhere on our map!

10. Populate Map elements
    a. Extent Map
        i. Add a new map frame to the bottom left of the map elements area for Extent map.
            1. Make sure to leave enough space below for a scale bar.
            2. Make sure the extent map frame is a perfect square.
            3. Also you should leave an even gap above and to the left of this map frame. Make sure that this spacing is even so it looks nice.
        ii. With the exent map selected, remove the Service Layer Credits the same way we did before.
        iii. Now, right click and activate the extent map frame. Zoom out and frame the island nicely. When you're done, close activation.
            1. Tip: Use shortcut keys "c" and "z" to pan and zoom while any map frame is activated.
        iv. Importantly, select your extent map and in the menus above, select "Extent Indicator" and choose your main map frame.
            1. On the right, in Drawing Order, you should see an option for extent indicators. Right click and choose properties.
            2. Change the symbol outline color to red.
            3. Collapse to point: smaller than 4pt.
                a. Symbol for collapse to point: Red fill. Size = 5
            4. Apply.
        v. This is a great time to look at the airport runway and make adjustments to symbology so its not too dark or thin. Mine is too dark, see example below. (0.1 works well.)

Checkpoint: Your Exent map should look something like this: (this doesn't show my extent indicators)

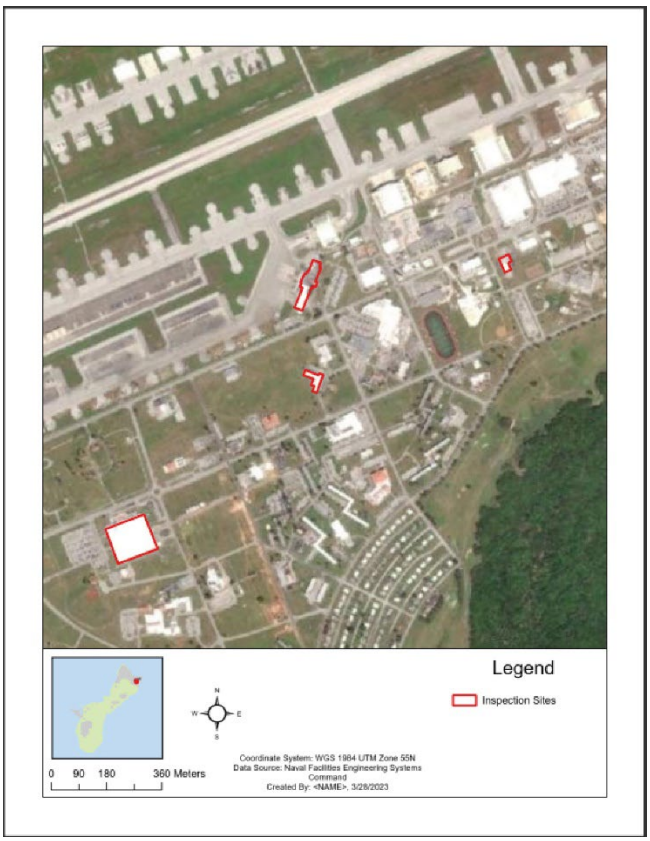
    b. Neatline
        i. Just make sure your line thicknesses for your map frame outline and rectangle are the same. They should be, but it's a good idea to check and also make sure everything is lining up nicely.
    c. Legend
        i. Insert a single column legend on the right side of your map elements area.
        ii. Your legend must contain each of your map layers but doesn't have to contain layers in your extent map.

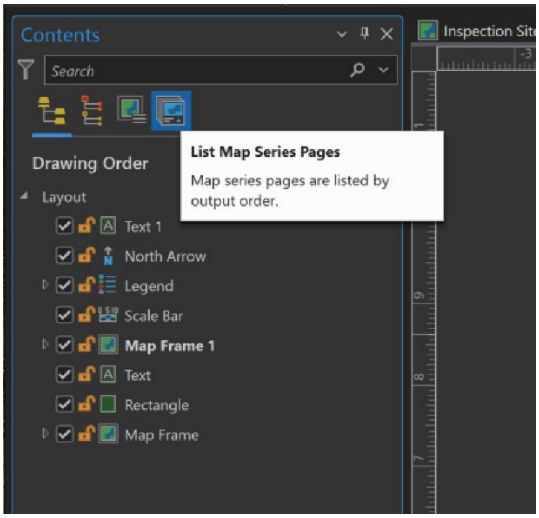
iii. Give the legend a title, "Legend" is fine. In reality, the legend title doesn't matter so much as the information and order of your layers. You'll want "Inspection Sites" at the top since it's the most important.
iv. While your legend is selected, go to Drawing order on the left and uncheck GU_Ocean. We only want "Inspection Sites on our legend. In "Drawing Order, you can also rename Inspection_Sites to "Inspection Sites" removing the underscore.
    1. This has to be done in the layer, cannot rename features in the Legend group. Renaming a layer in Drawing Order will rename it on your legend.
v. All text Arial or Calbri, just make sure that ALL text is the same san serif font. (use Arial)

d. Scale bar
    i. Format "Scale Line 1" with 2 divisions and 2 subsivisions.
    ii. Make sure the scale bar is referencing our main map, not the extent. (in properties)
    iii. Units: Meters
    iv. Unit label position: After
    v. Make sure that your scale bar shows round numbers! No odd deliniations please. (OK Ex: 0 : 125 : 250 : 500…… Bad Ex: 0 : 87.5 : 175 : 350)
    vi. Place your scale bar below your extent map.
e. North Arrow
    i. I would like to see a compas rose. Type: "ArcGIS North 12"
        1. Place this just to the right of your extent map.
f. Credits and Sources:
    i. Create a normal textbox at the bottom of your map elements area in the cetner. This will be for our credits. Today I'll be giving you some code for a dynamic date but its worth mentioning that there are a ton of dynamic text options to explore.
    ii. Right click on your text box and open properties.
    iii. Set text symbol to Arial, Regular, 8pt font
    iv. Position -> Horizontal Alignmnet = Center
    v. Write the following in the text field: (Replace <NAME> with your full name)

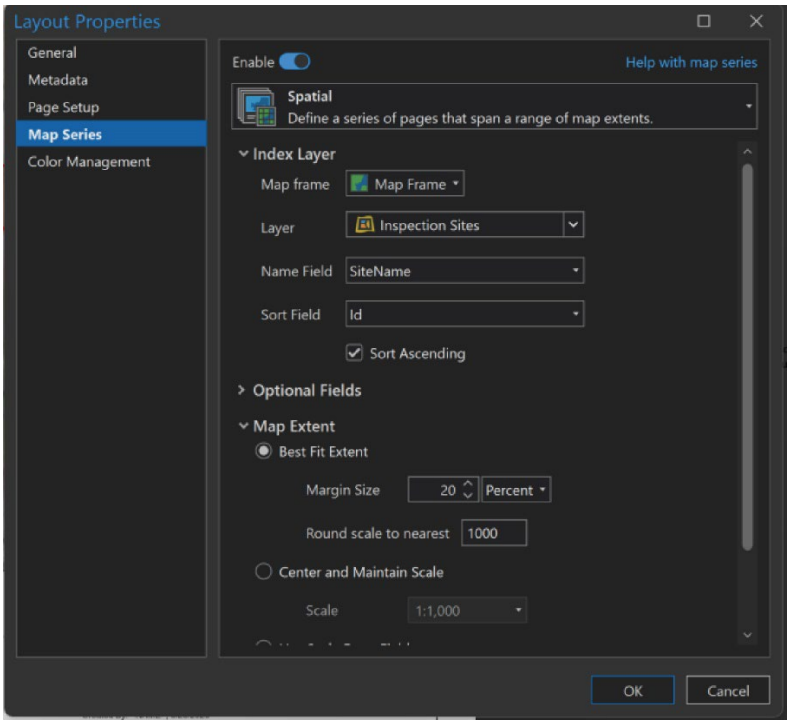
Coordinate System: WGS 1984 UTM Zone 55N
Data Source: Naval Facilities Engineering Systems Command
Created By: <NAME>, <dyn type="date" format=""/>

Checkpoint: Your map should look something like this:





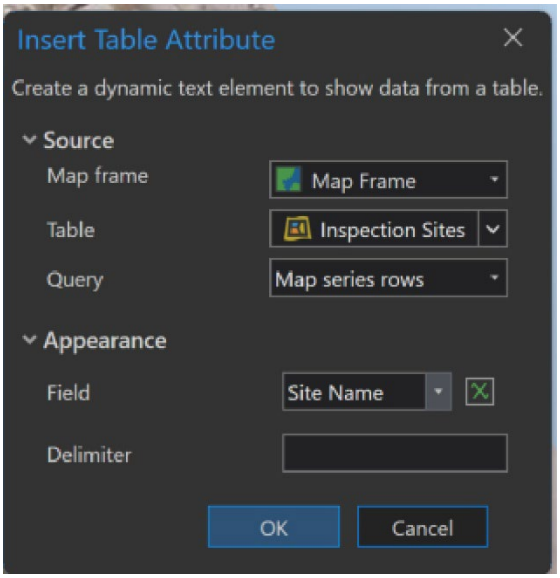
11. Making A Map Series:
    a. OK, at this point we have most of a map (excluding the title).
    b. On the left, above Drawing Order, you'll see some options. **Select Map Series** (shown above)
    c. Right click Layout and open Properties.
    d. Toggle the Enable button and format as shown below:

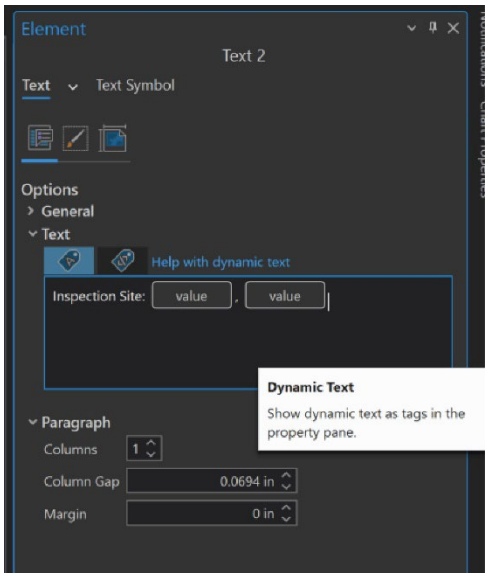


e. Make sure that Margin size is adjusted to 20% and that you are working with the correct map frame. You'll know it's the wrong one if you don't see the "Inspection Sites" layer.
f. Click OK.

12. Insert Dynamic Title:

a. In the Dynamic Text drop-down, find and choose "Table Attribute -Value"
b. Format as shown below on the left.
c. Click OK and draw your text box at the top and center of your map elements area.





13. Title Properties:

a. Right click your dynamic title and open properties.
b. Copy and paste your dynamic text so you have two. Then open the second, and adjust the settings to display the "Instalation" field.
c. At the very beginning of your dynamic title, add the phrase "Inspection Site: " (space at the end)
d. In between your two value fields, add comma space ", "
e. Boom, you're creating dynamic text like a pro!
f. The last step is to adjust your titles text size and font. I recoment Arial, and I think I used 14 font but use what looks good and fits. You can allways adjust this later.
    i. Make sure you have Position set to center.

14. Proof, Proof, and Proof Again

a. Before I print any map, I'll do a once over (a few times) to make sure everything looks great. Here are a few things to look for:
    i. In a map series, your scale bar will auto adjust to the scale of the map. You should go though each map in your map series and make sure the numbers are round, nice numbers.
    ii. Make sure your dynamic title text box is long enough. Some text might be longer and will use an extra line. For instance, Naval Base Guam is shorter than Andersen Air Force Base. (this can also happen with long site names). For this reason its best to format your titles text box really wide and center the text.
    iii. Add a logo for your company, institution or school. I'll try to find one and include it in the data for this exercise. **If its there, try and fit it under the title. (I found it)**
    iv. Make sure your text is all the same font. (or at least similar) for titles, legends and scale bars
    v. Sometimes when working with Map Series, its good to group them by area so that your extent map is more useful. For instance, in this exercise we have sites in the far north of the island and sites on Naval Base Guam. What maybe you/we should have done for this exercise is split the shapefiles by installation and done 2 map series. This way the extent could be of the installation instead of the entire island.
        1. The points on our extent map are kind of useless since the extent map extent is so large.
    vi. A tip which will make your maps more proffessional is categorizing your text sizes on your map by importance. For example, it doesn't look great to have a legend title bigger than your main title.

15. Export:

a. For a map series, there are special export options since you can either export an individual map or a single PDF with one map per page.
b. Important distinction from a normal export is that you can only export as a PDF. (This is so anoying but you can get around this by converting to JPEG through Adobe.)
c. Before you go to the Map Series Tab, make sure your file destination is set.
d. For this exercise, lets export 1 big PDF (unless your instructor wants something differrent)
    i. Share -> Export Layout
    ii. There's a tab for Map Series
    iii. Choose "All (10 pages)"
    iv. Choose "Single PDF File"

I hope this was fun for everyone! Map Series and dynamic text are super cool.
Cheers, Avery