

GIS Software and Digitization Basics

Training on Mapping with Drones

13th November 2019

Rajitha Athukorala



AIT
Asian Institute of Technology

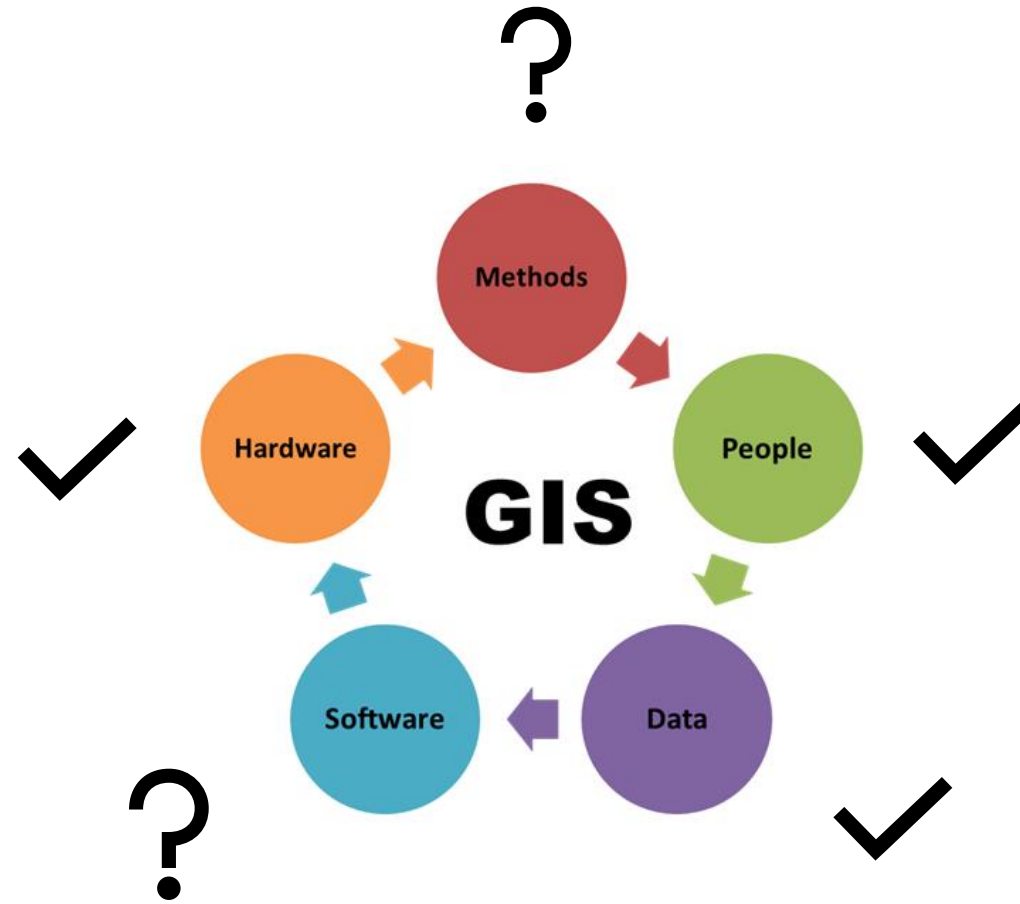
GIC 
Geoinformatics Center



Recap:

- During the past few days, you were taught on how to collect images from UAVs followed by the use of photogrammetry and GNSS ground control to produce map products.
- Next step in the process of using this information to solve real world problems and help decision making would be to integrate the information to a GIS.
- But how to do that?

What is next?

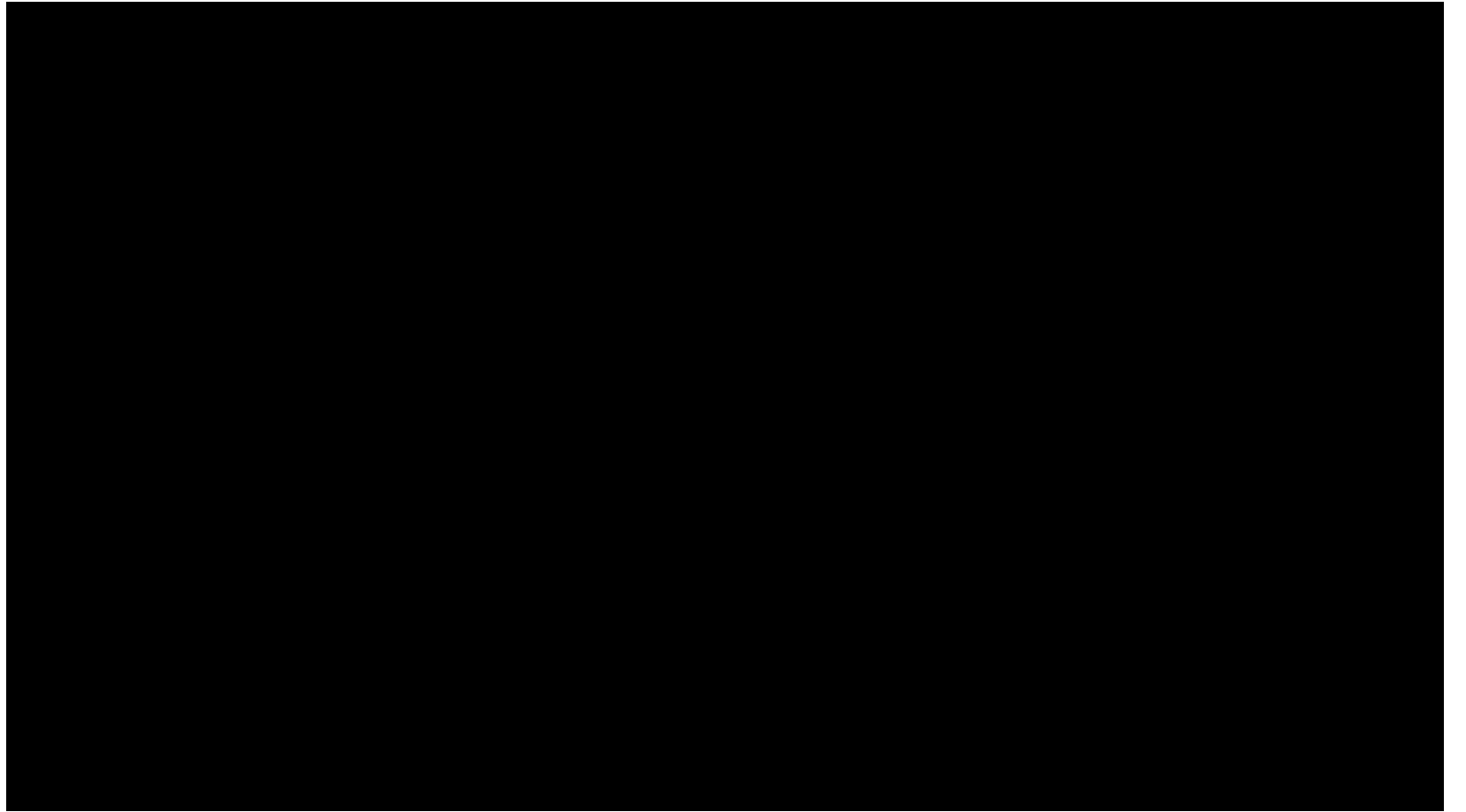


GIS Software





ArcGIS



The QGIS logo is centered within a large, light blue circular brushstroke. The logo itself consists of the letters 'QGIS' in a bold, green, sans-serif font. The letter 'Q' is stylized with a white outline and a small orange and green square graphic at its top-left corner, resembling a map cursor or a location pin.

QGIS



Open source



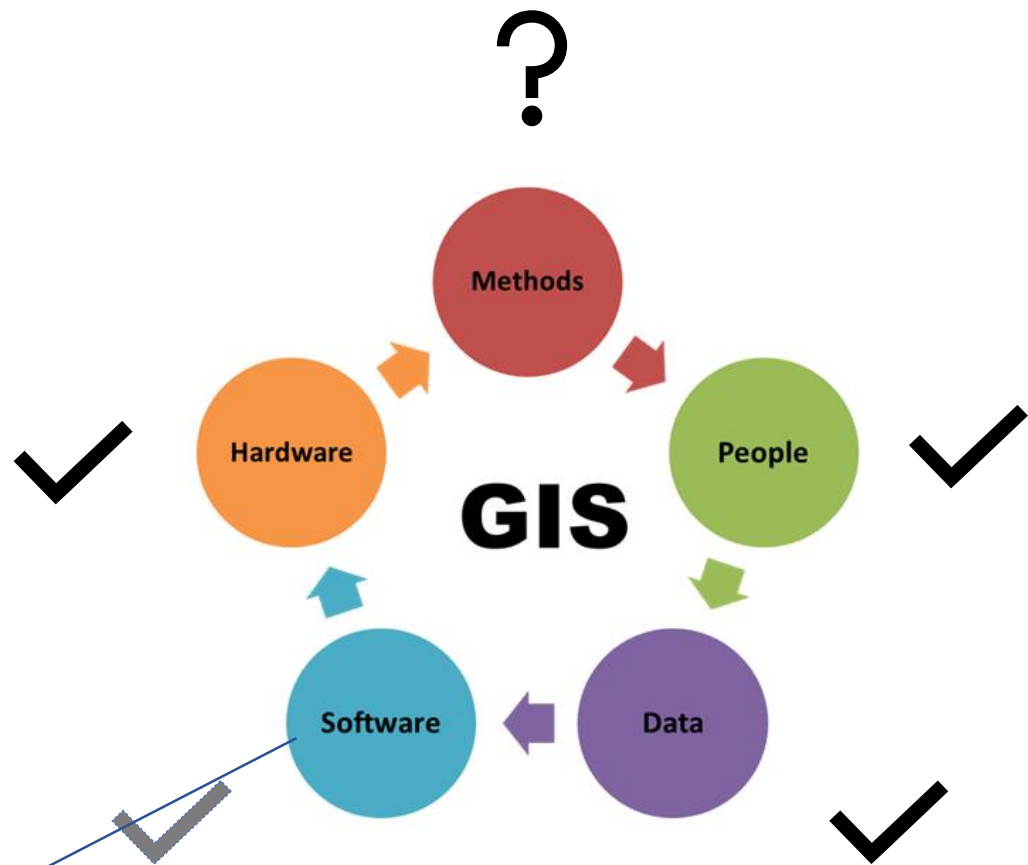
Easy access to other open source software (R, Python, GRASS, etc)



Runs on all major OS



Very active global community



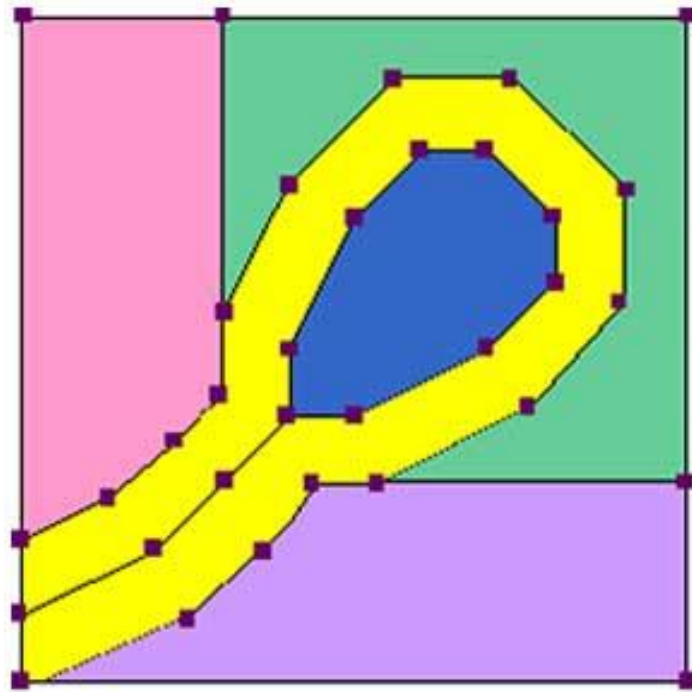
At least we know
the names now



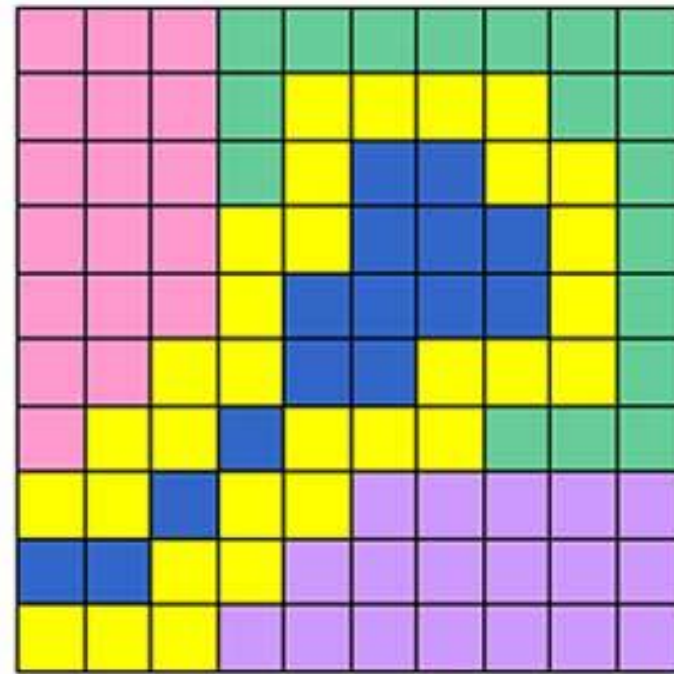
GIS methods



Representation of the real world



Vector



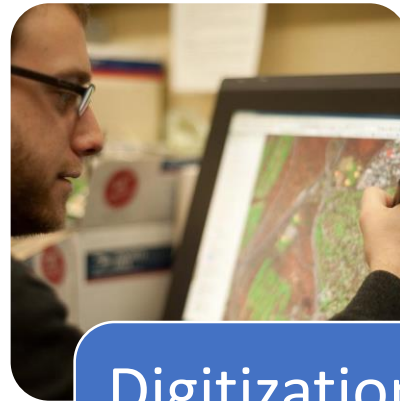
Raster

What is Digitization?



Raster data

- Paper maps
- Images



Digitization

- Computer



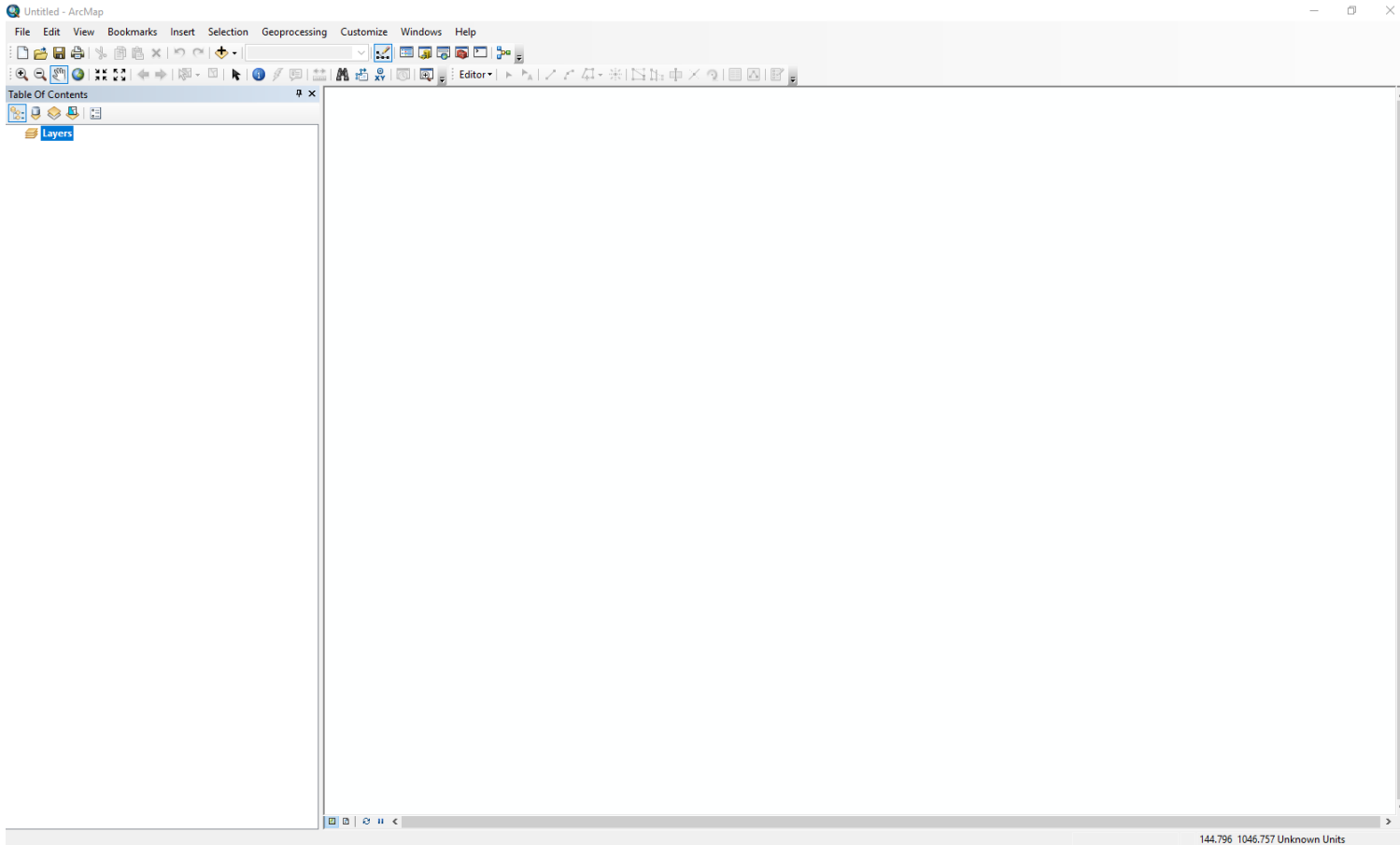
Vector data

- Points
- Lines
- Polygons

Why Digitize?

Digitized maps can contain more information than just an image

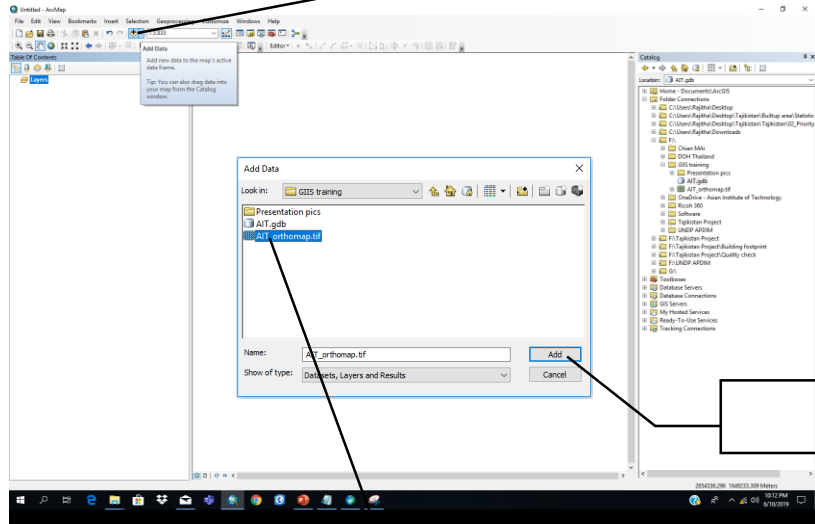




Basic interface in ArcMap

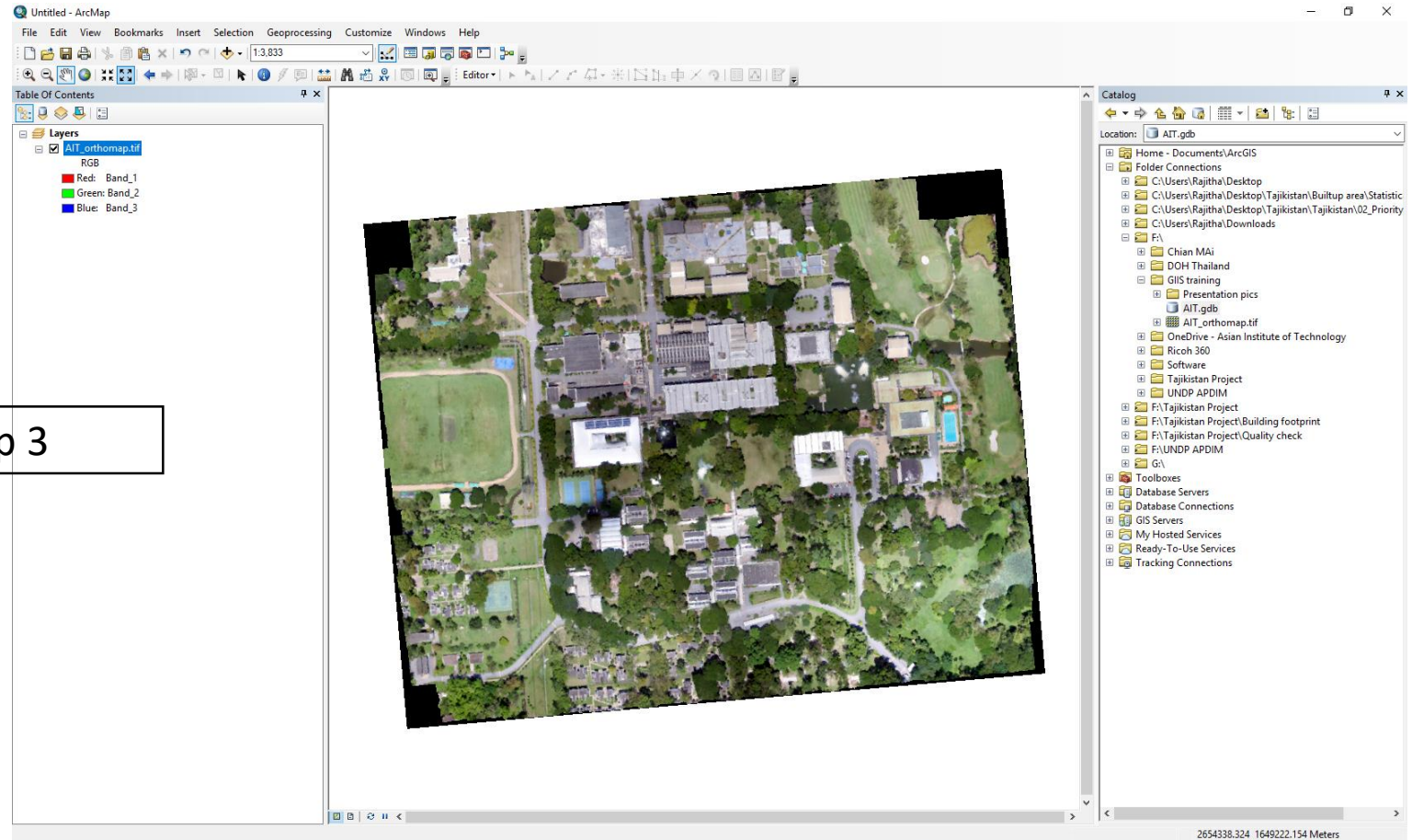
Loading the UAV map product as the base canvas

Step 1



Step 3

Step 2



Creating a file geodatabase

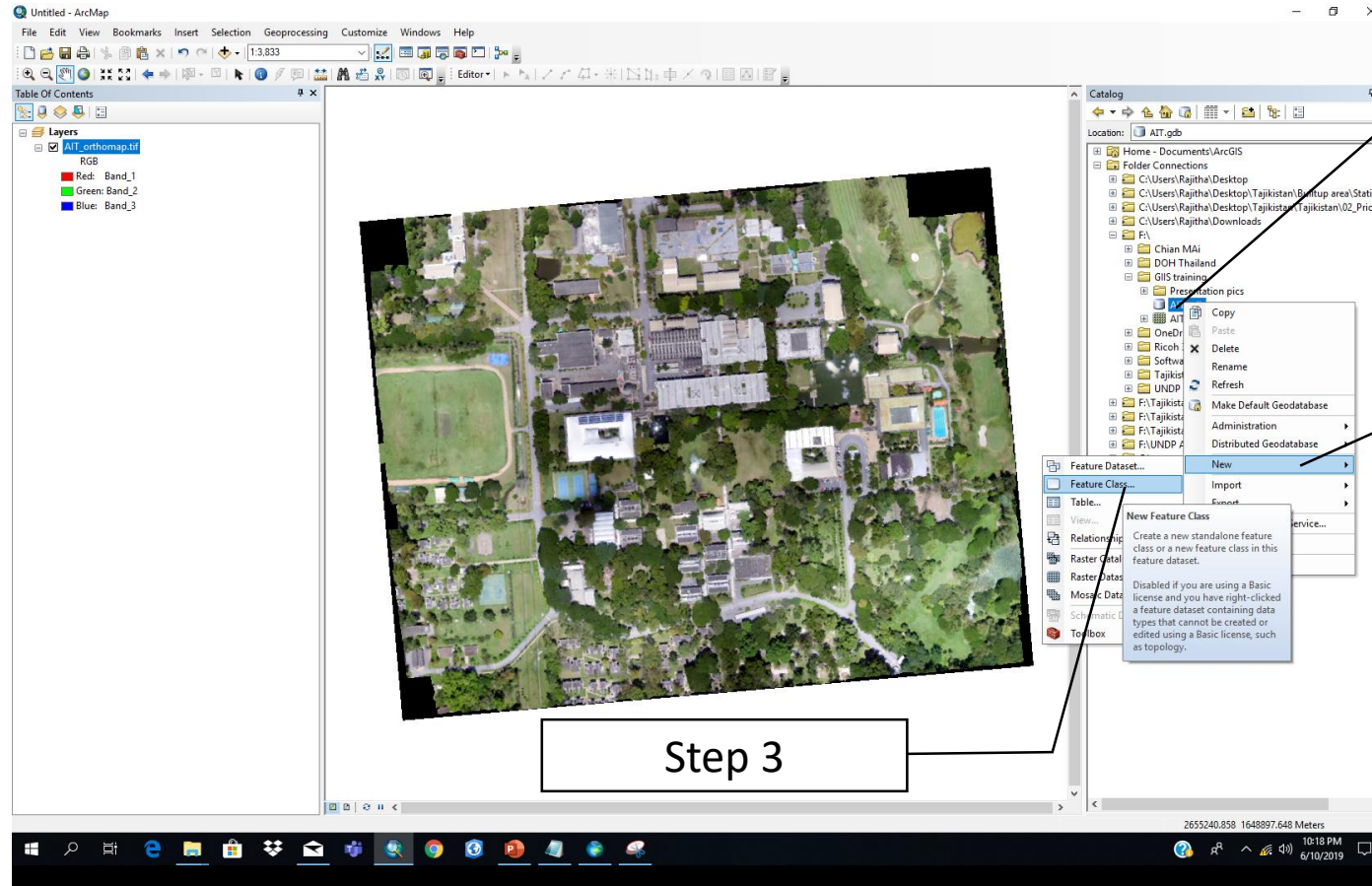
Step 1

Step 2

Step 3

The screenshot illustrates the process of creating a file geodatabase in ArcMap. It shows the main interface with an aerial map, the Table of Contents, and the Catalog pane. The Catalog pane shows the location of the geodatabase: `Home - Documents\ArcGIS\Folder Connections\C:\Users\Rajitha\Desktop\Tajikistan\Tajikistan\02_Priority\F:\Presentation pics\AIT.gdb`. The geodatabase contains a file named `AIT_orthomap.tif`.

Creating a new feature class



Create a polygon vector file for buildings

New Feature Class

Name:

Alias:

Type

Type of features stored in this feature class:

Polygon Features

Geometry Properties

Coordinates include M values. Used to store route data.

Coordinates include Z values. Used to store 3D data.

< Back Next > Cancel

New Feature Class

Choose the coordinate system that will be used for XY coordinates in this data.

Geographic coordinate systems use latitude and longitude coordinates on a spherical model of the earth's surface. Projected coordinate systems use a mathematical conversion to transform latitude and longitude coordinates to a two-dimensional linear system.

Type here to search

- Geographic Coordinate Systems
- Projected Coordinate Systems
- Layers

Current coordinate system:

GCS_WGS_1984
WKID: 4326 Authority: EPSG

Angular Unit: Degree (0.0174532925199433)
Prime Meridian: Greenwich (0.0)
Datum: D_WGS_1984
Spheroid: WGS_1984
Semimajor Axis: 6378137.0
Semiminor Axis: 6356752.314245179
Inverse Flattening: 298.257223563

< Back Next > Cancel

New Feature Class

Choose the coordinate system that will be used for XY coordinates in this data.

Geographic coordinate systems use latitude and longitude coordinates on a spherical model of the earth's surface. Projected coordinate systems use a mathematical conversion to transform latitude and longitude coordinates to a two-dimensional linear system.

Type here to search

- Indian Ocean
- North America
- Pacific Ocean
- Solar System
- South America
- Spheroid-based
- World
- Projected Coordinate Systems
- Layers

Current coordinate system:

GCS_WGS_1984
WKID: 4326 Authority: EPSG

Angular Unit: Degree (0.0174532925199433)
Prime Meridian: Greenwich (0.0)
Datum: D_WGS_1984
Spheroid: WGS_1984
Semimajor Axis: 6378137.0
Semiminor Axis: 6356752.314245179
Inverse Flattening: 298.257223563

< Back Next > Cancel

New Feature Class

Choose the coordinate system that will be used for XY coordinates in this data.

Geographic coordinate systems use latitude and longitude coordinates on a spherical model of the earth's surface. Projected coordinate systems use a mathematical conversion to transform latitude and longitude coordinates to a two-dimensional linear system.

Type here to search

- WGS 1966
- WGS 1972
- WGS 1972 TBE
- WGS 1984
- WGS 1984 (G1150)
- WGS 1984 (G1674)
- WGS 1984 (G1762)
- WGS 1984 (G730)
- WGS 1984 (G873)
- WGS 1984 (Tropics)

Current coordinate system:

GCS_WGS_1984
WKID: 4326 Authority: EPSG

Angular Unit: Degree (0.0174532925199433)
Prime Meridian: Greenwich (0.0)
Datum: D_WGS_1984
Spheroid: WGS_1984
Semimajor Axis: 6378137.0
Semiminor Axis: 6356752.314245179
Inverse Flattening: 298.257223563

< Back Next > Cancel

New Feature Class

XY Tolerance

The XY tolerance is the minimum distance between coordinates before they are considered equal. The XY tolerance is used when evaluating relationships between features.

Degree

Reset To Default [About spatial reference properties](#)

Accept default resolution (recommended)

< Back Next > Cancel

New Feature Class

Specify the database storage configuration.

Configuration Keyword

Default

This option uses the default storage parameters for the new table/feature class.

Use configuration keyword

This option allows you to specify a configuration keyword which references the database storage parameters for the new table/feature class.

[About Configuration Keywords](#)

< Back Next > Cancel

New Feature Class

Field Name	Data Type
OBJECTID	Object ID
SHAPE	Geometry
Name	Text

Click any field to see its properties.

Field Properties	Name	
Alias		
Allow NULL values	Yes	
Default Value		
Length	50	

Import...

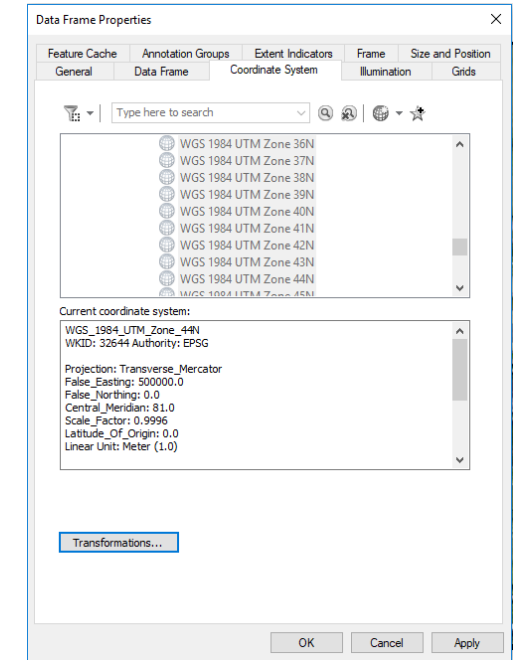
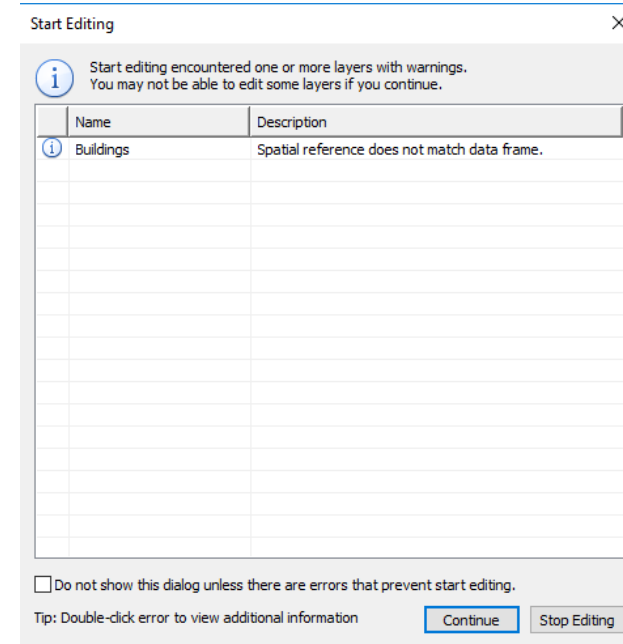
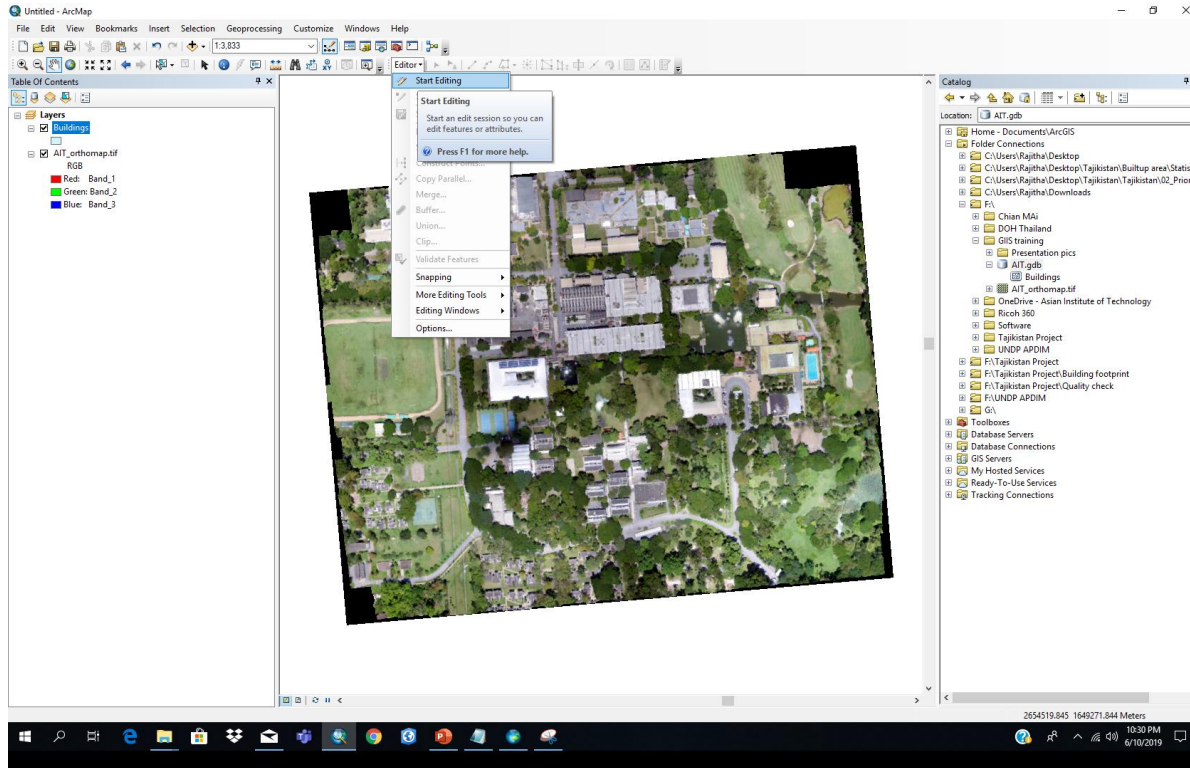
To add a new field, type the name into an empty row in the Field Name column, click in the Data Type column to choose the data type, then edit the Field Properties.

< Back Finish > Cancel

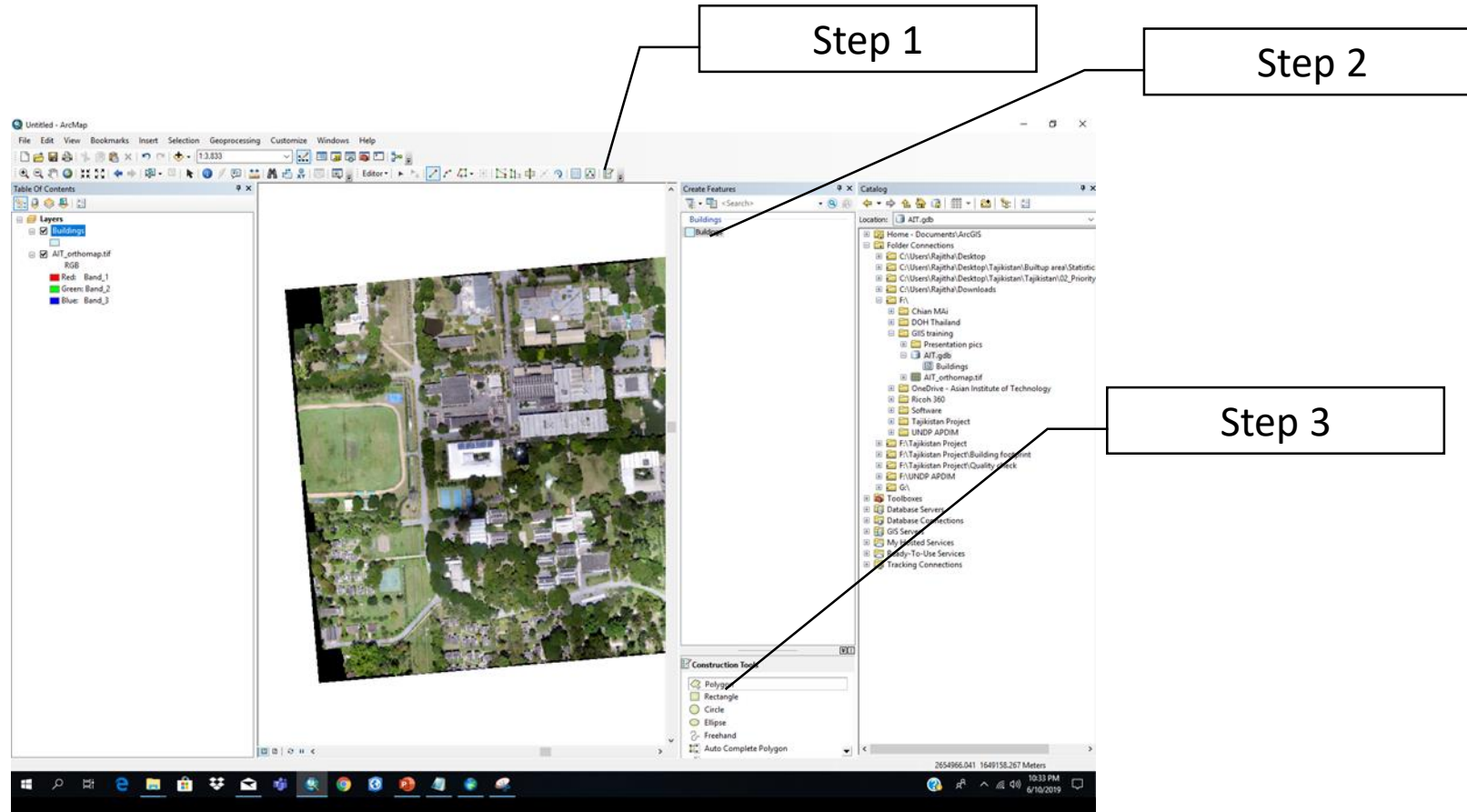
Table Of Contents

- Layers
 - Buildings
 - AIT_orthomap.tif
 - RGB
 - Red: Band_1
 - Green: Band_2
 - Blue: Band_3

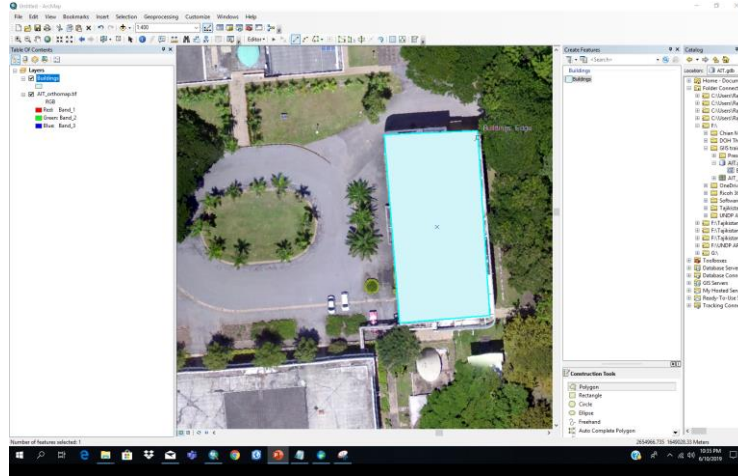
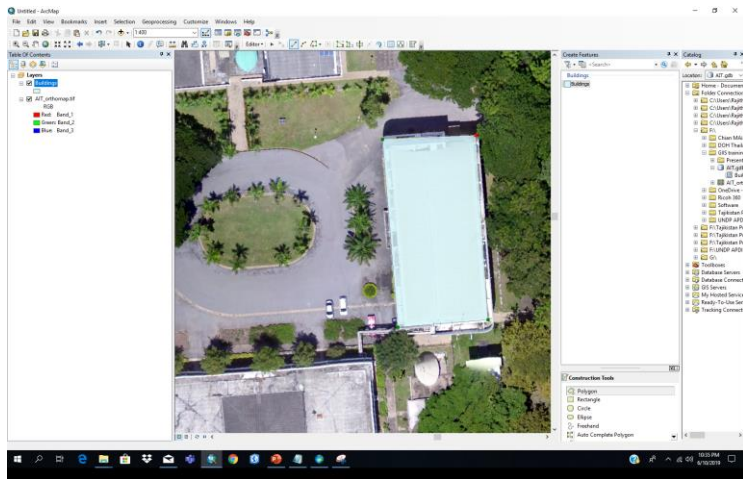
Lets start editing the buildings layer



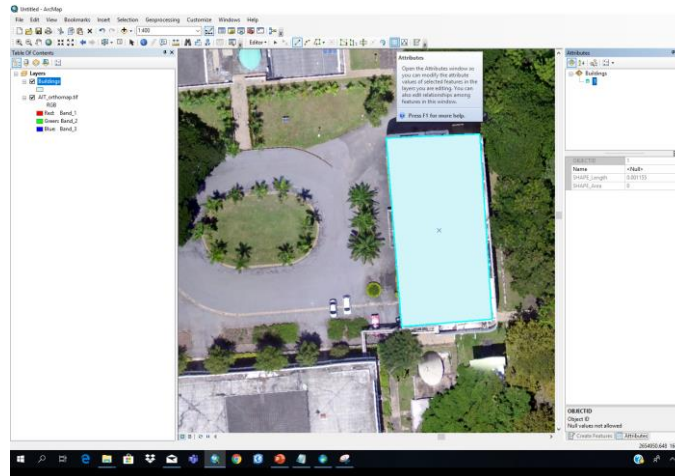
Lets start editing the buildings layer



Now time to start drawing



OBJECTID	1
Name	Energy building
SHAPE_Length	0.001155
SHAPE_Area	0



Repeat the same for the other buildings too

