BANGLADESH DIGITAL MAPPING ASSISTANCE PROJECT
(BDMAP)

OPERATION MANUAL
FOR
DTM & ORTHOPHOTO

AUGUST 2011

VERSION-1

Introduction

1. General

This Operation Manual is prepared by officers of Survey of Bangladesh who were trained in Bangkok in Thailand for DTM / ORTHOPHOTO with MATCH-T DSM, DT MASTER, ORTHO MASTER & ORTHO VISTA as the one of the programs of IDMS project of Bangladesh. They prepared the Operation Manuals during the Factory Training in there. BDMAP made some compilation to the Operation Manuals and made some amendment to make let anybody can understand and operate smoothly without troubles on actual job done.

BDMAP expects SOB that the operation manual should be revised time to time according to the improvement of DTM & ORTHOPHOTO progress, developing of software and technology. It means this Manual is not the final one but just “Version 1” and has to be revised in future. Please note that this kind of manual should be positioned as REFERENCE only.

Followings are the name of trainees and officers who were trained on factory training program in Bangkok on 28 November 2010 to 18 December 2010 and participated for preparation of this Operation Manual.

- Moha. Ashraful Alam
- Mohammad Kabir Hossen

2. MATCH-T DSM

2-1. MATCH-T DSM Generals: (DTM generation)

MATCH-T DSM is the software for the DTM and products of Trimble INPHO Photogrammetric System providing highly precise automatic digital elevation model generation with "**MATCH-T DSM**".

All the processing steps of “MATCH-T DSM“ are fully automated for achieving highest productivity. The workflow is logical and easy from the project setup, the precise multi-ray tie point matching digital elevation modeling and editing .

Automatic DTM Generation needs AT results(Project ,Images ,Orientation) Including used camera name.

After Processing get Automatic dtm.

2-2 DTMaster Generals: (DTM Editing)

The purpose of this manual is to give detailed information about entries or parameters of **"DTMaster"**, information on how to check and edit terrain data and how to do measurements.

DT Master is a DTM editor. DT Master is not connected to a CAD or GIS software. Import Vector data into DT Master. Then it is possible to:

- Measure new data
- Re-measure existing data
- Edit existing data
- Reclassify data
- Add data to existing data
- Review data
- Check quality of data
- Delete data
- Export data
- After Processing get Manual editing dtm.

2-3 Orthophoto Generals:

Interpolation of large height models that can't be generated with the OrthoMaster functionality or takes a lot of time in OrthoMaster. The preparation has to be done with the DTM Toolkit, callable from the ApplicationsMaster menu. The interpolation in DTM Toolkit has special functionality to handle very large data sets in a fast and efficient way.

OrthoMaster is controlled by the ApplicationsMaster and designed to generate orthophotos in a smooth and easy way – single ones as well as complete sets from an image block. Its main features are:

- Use of the INPHO project files defined with the ApplicationsMaster
- Data import from different sources to interpolate or use height models
- Consideration of break lines and mass points with the integrated DTM interpolation package
- Automatic computation of ortho-areas
- Sophisticated selection tools for single images and data blocks
- Fast and sophisticated ortho-rectification tools
- Generation of true orthophotos in combination with OrthoVista .

2-4 OrthVista Generals: (Orthophoto Tiling & Editing, Seam Line Edit)

OrthoVista is a powerful software product that improves the quality, utility and value of ortho-rectified, digital image mosaics by performing a series of radiometric adjustments designed to match color and intensity across component images and producing seamless image mosaics.

The Seam Editor is an add-on to OrthoVista, which enables you to define seam polygons manually. It is intended to be used in urban areas where the automatic approach of OrthoVista may produce a non-desired result.

DTM & ORTHOPHOTO GENERTION

SOFTWARE USED:

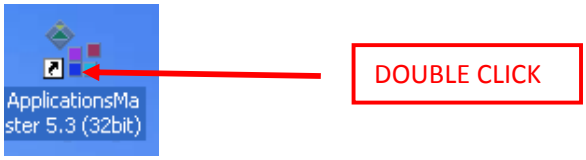
1. MATCH-T → Automatic DTM Generation
2. DT MASTER → DTM Editing (Manual)
3. ORTHO MASTER → Automatic Orthophoto Generation
4. ORTHO VISTA → Automatic Mosaic
   - SEAM LINE → Manual Editing

Operation Manual of Match-T

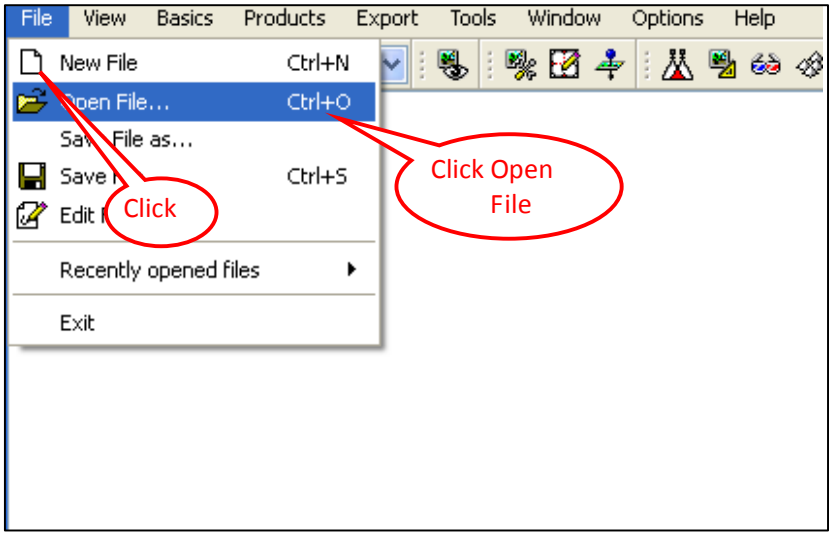
Contents of Match - T

1. Click on Application master icon ……1
2. Select File → Open……1
3. Select Project file……1
4. Camera & Frame Type Check……2
5. Camera Check……3
6. Frame Type Check ……4
7. Select Products → MATCH-T DSM → DTM/DSM Generator……5
8. Click Add……5
9. Setup Name, Region type and output file from Parameter Setting……6
10. Parameter Setting……7
11. Setting Grid minimum size (10m), Output Result file
(Project\Automatic DTM ……8
12. Start……9

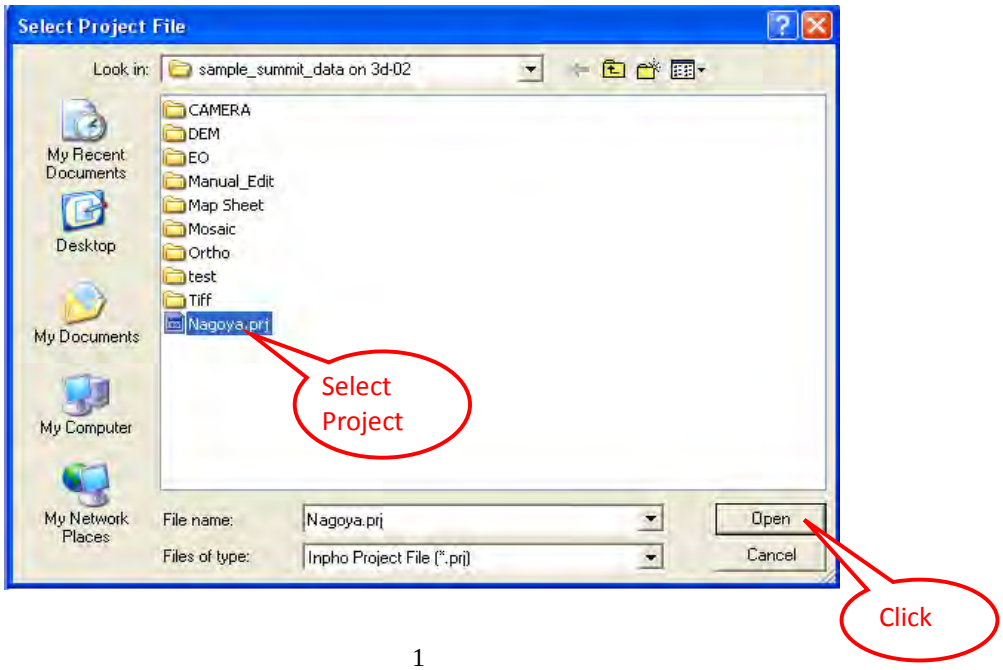
1. Click on Application master icon:



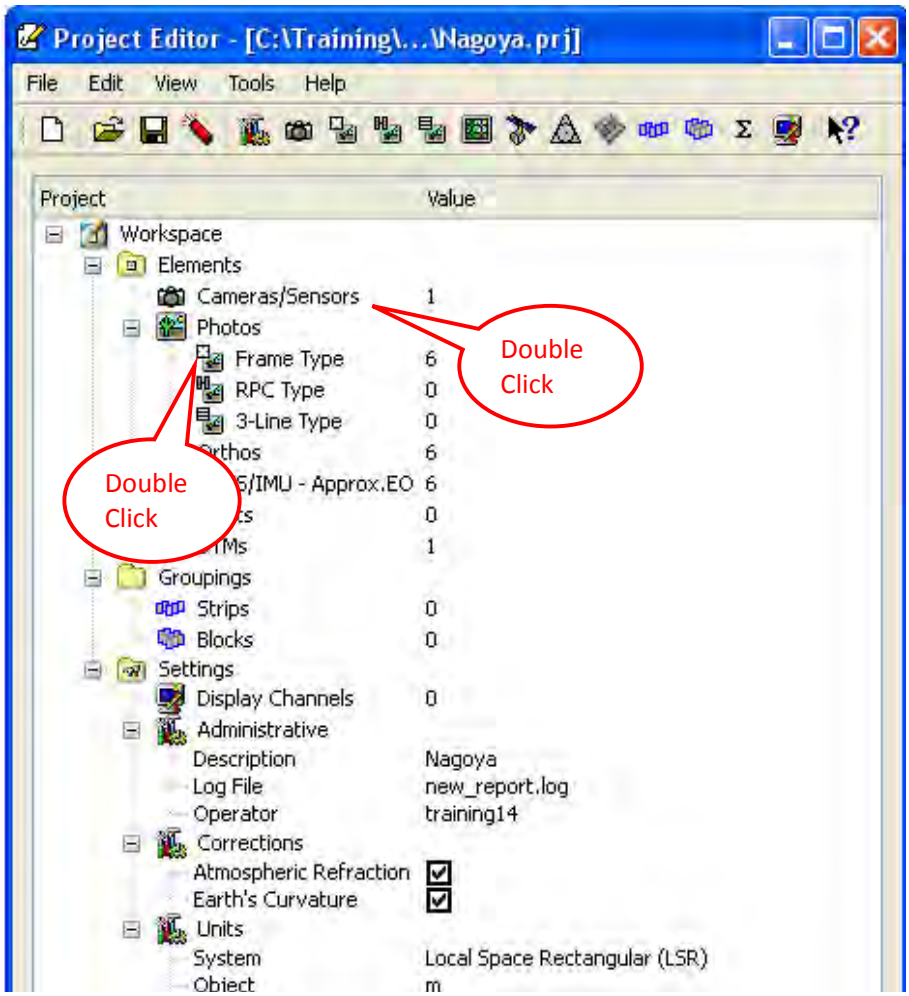
2. Select File ⟶ Open:



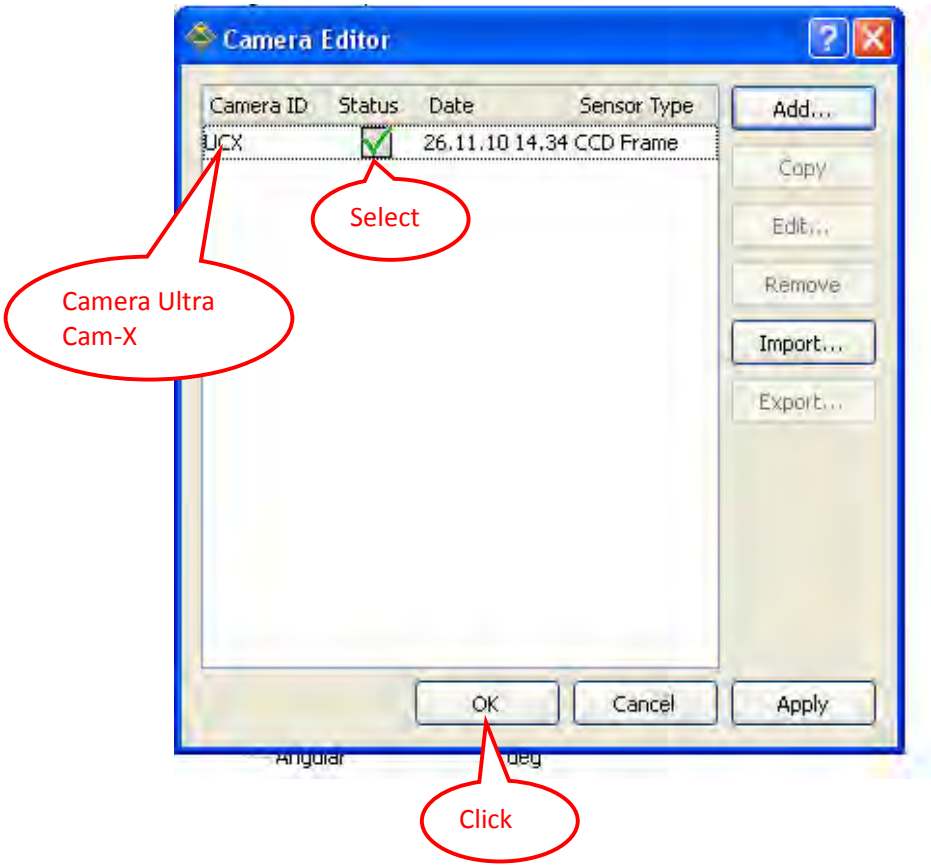
3. Select Project file



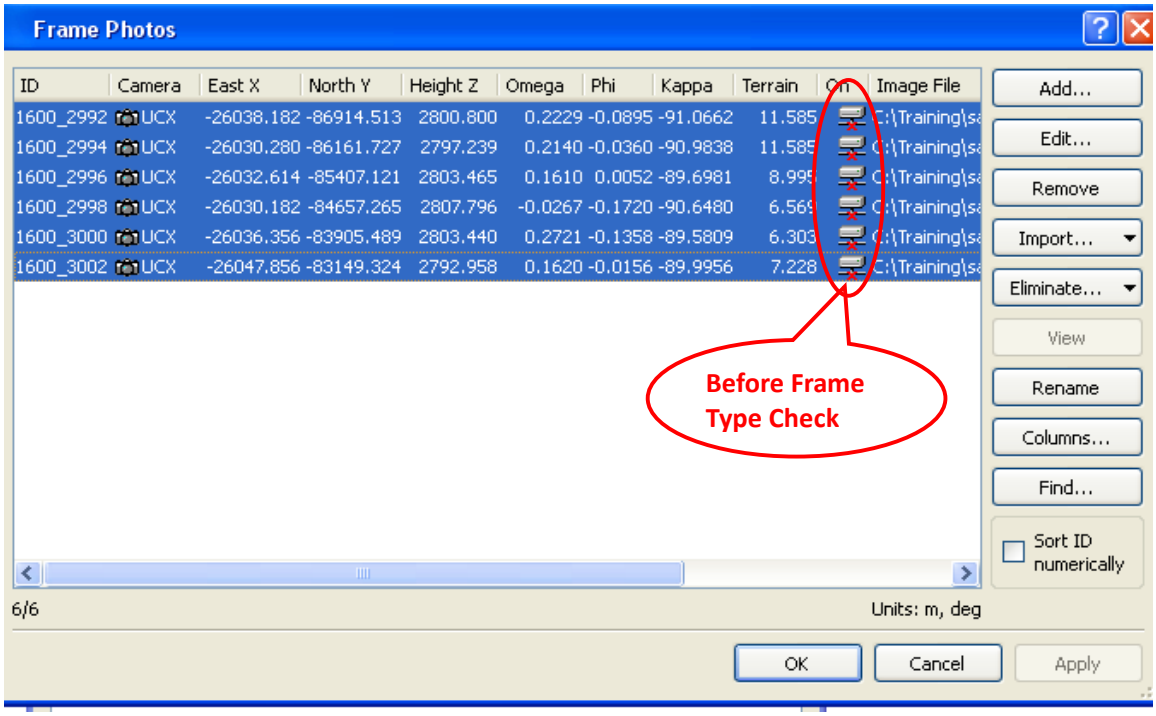
4. Camera & Frame Type Check:

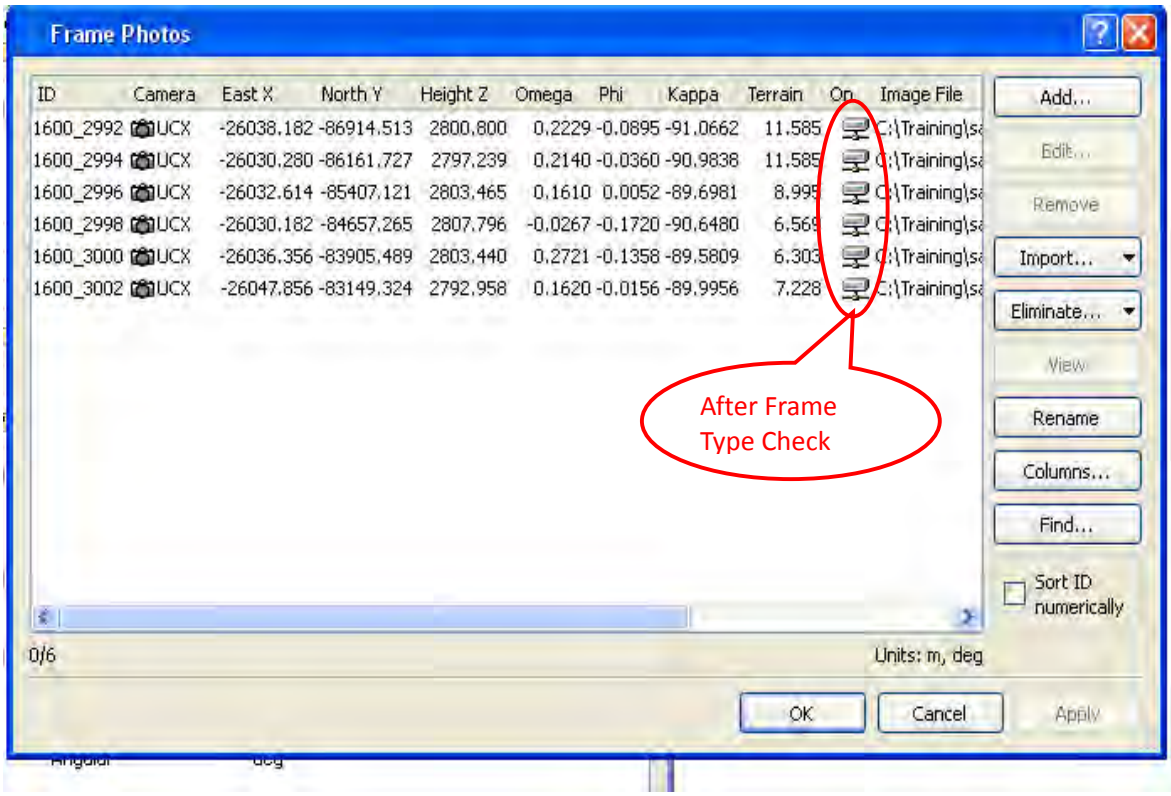


5. Camera Check:

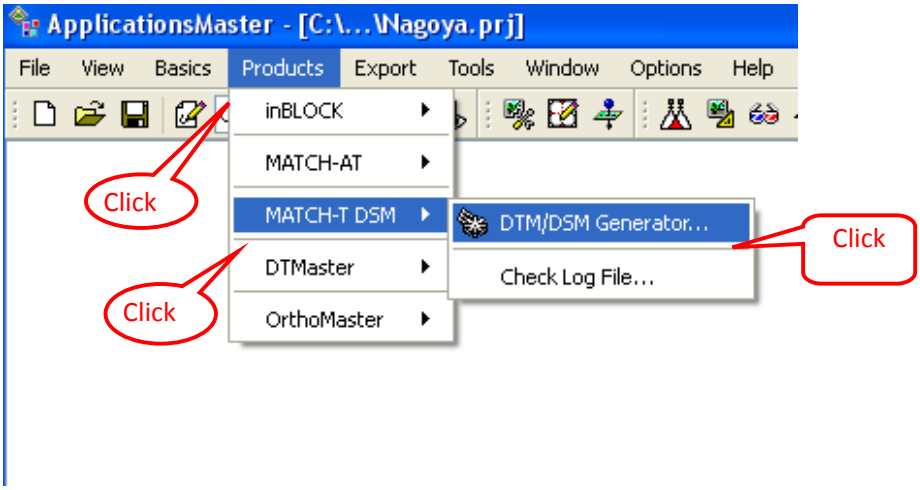


6. Frame Type Check :

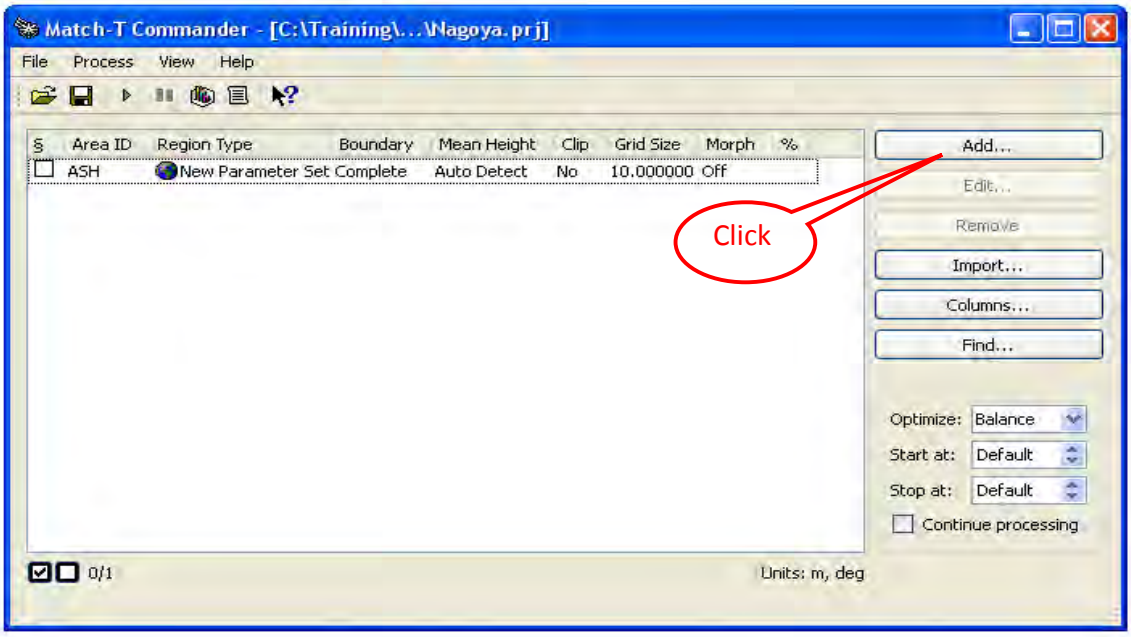




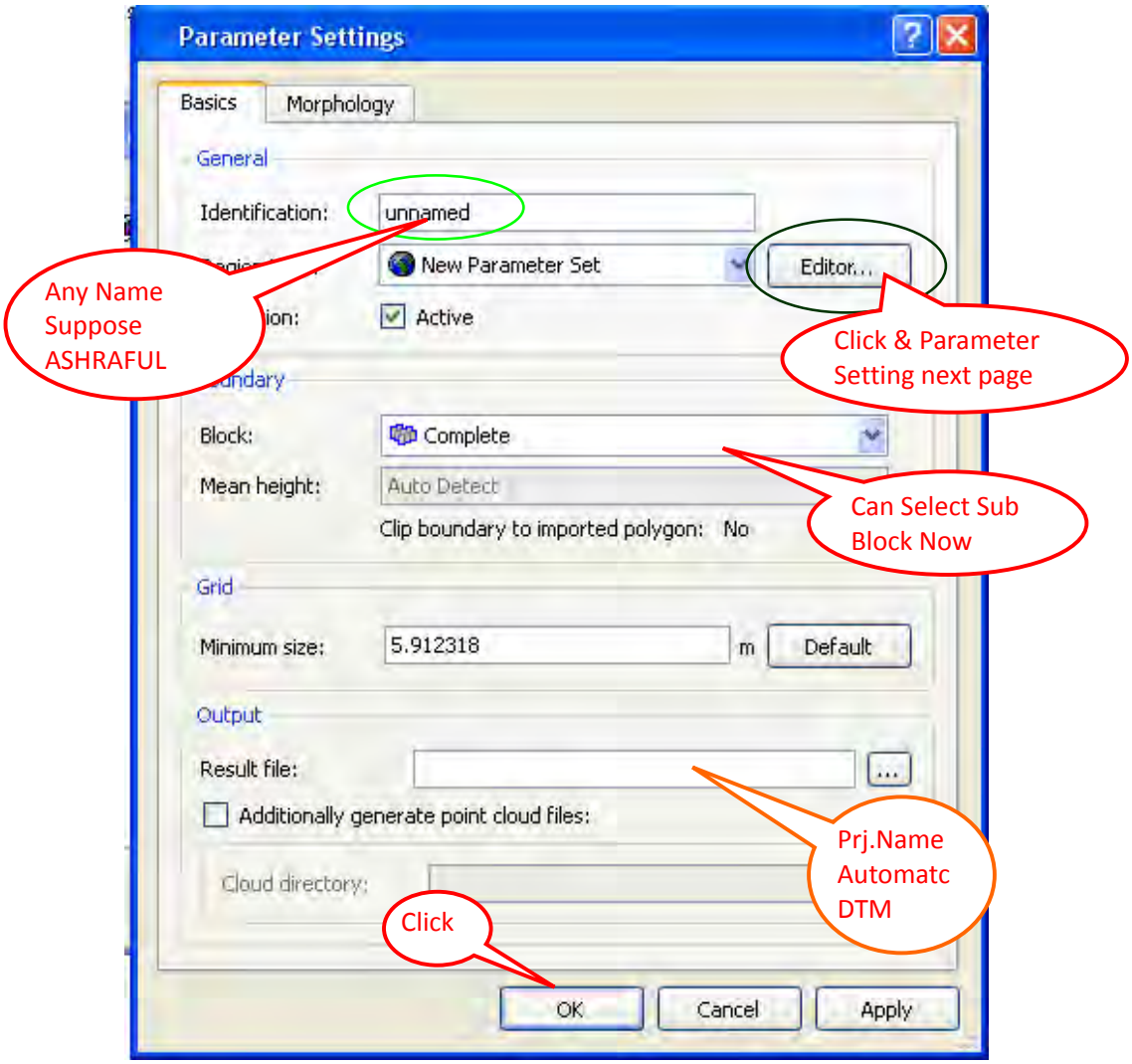
7. Select Products ⟶ MATCH-T DSM ⟶ DTM/DSM Generator:



8. Click Add

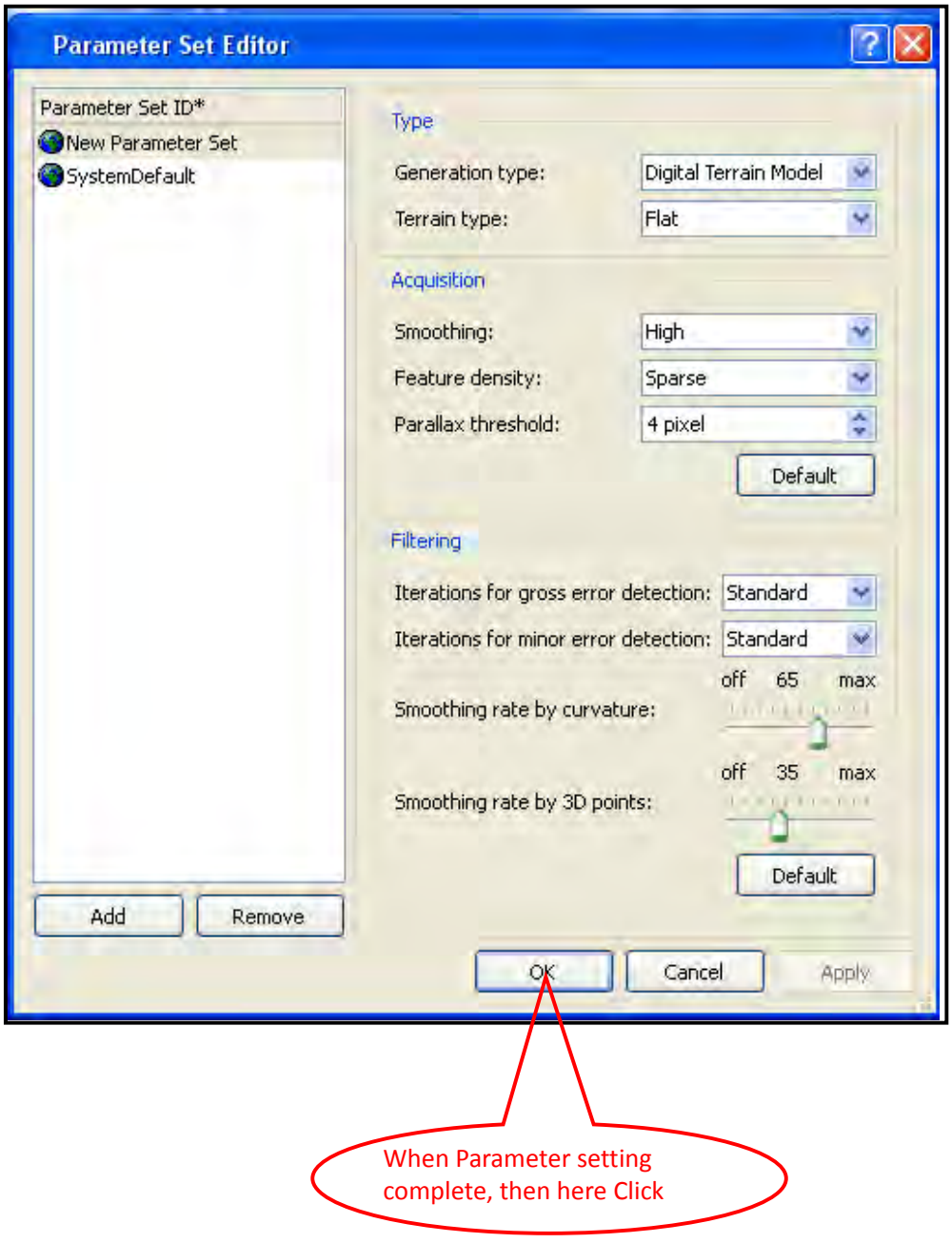


9. Setup Name, Region type and output file from Parameter Setting

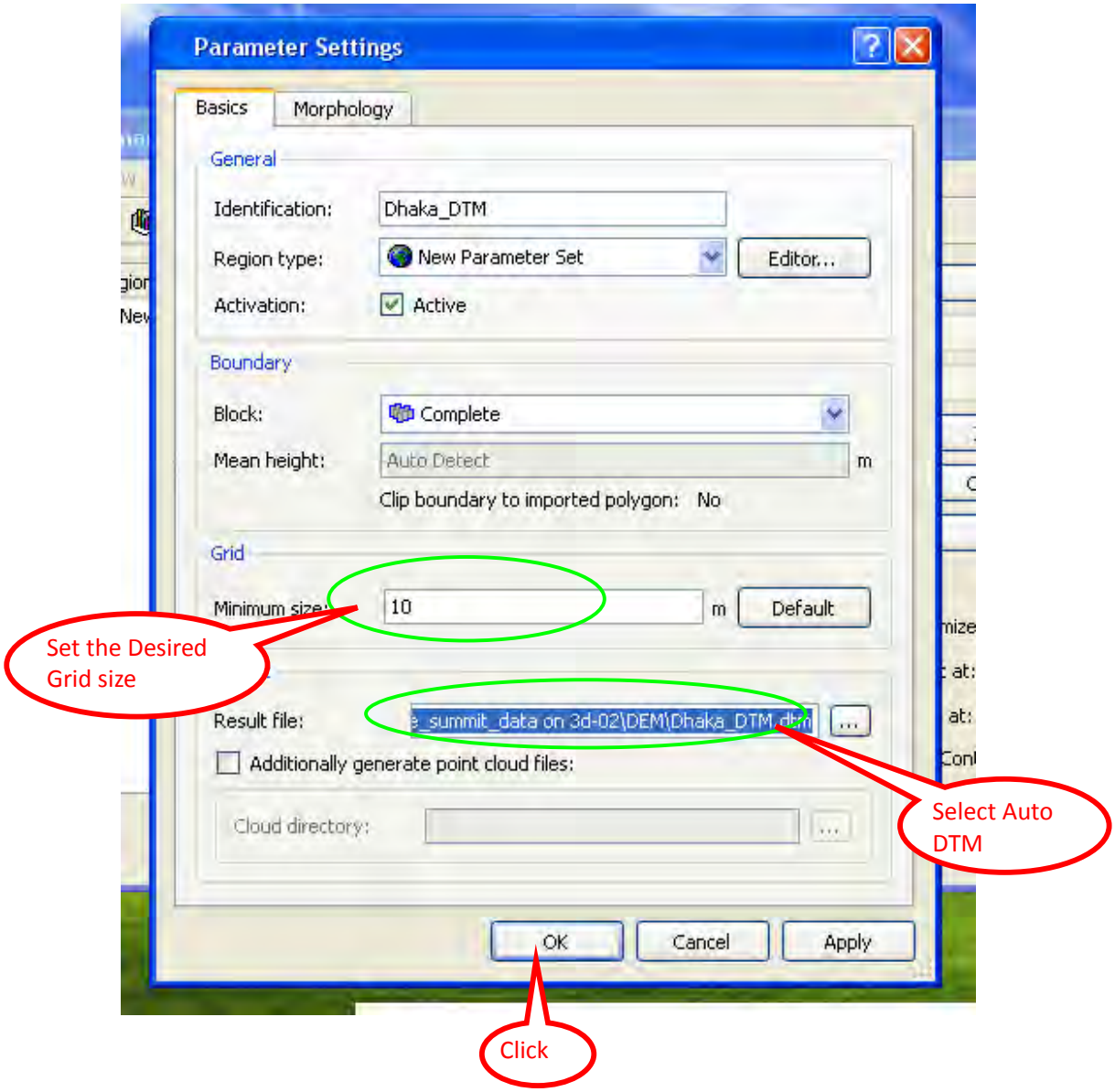


10. Parameter Setting

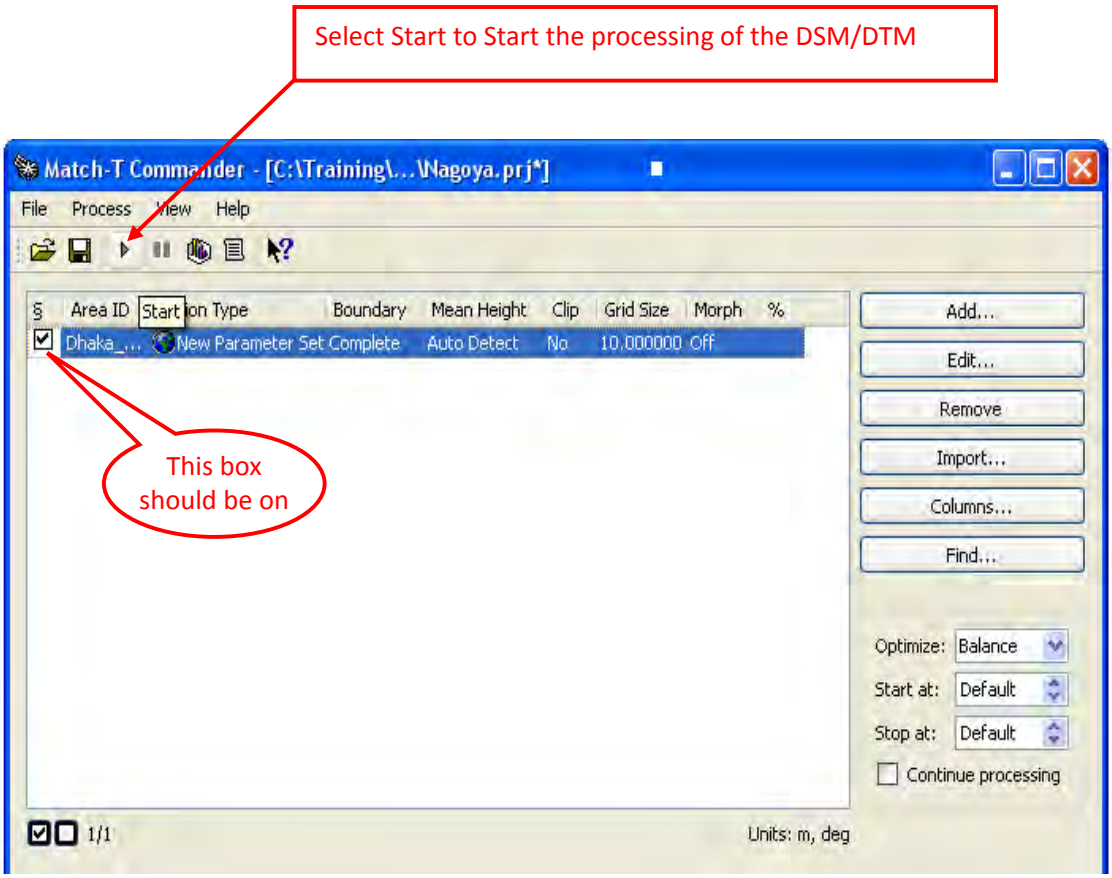
Setting of Generation Type, Terrain Type, Smoothing, Feature Density, Parallax Threshold.



11. Setting Grid minimum size (10m),Output Result file (Project\Automatic DTM:



12. Start:



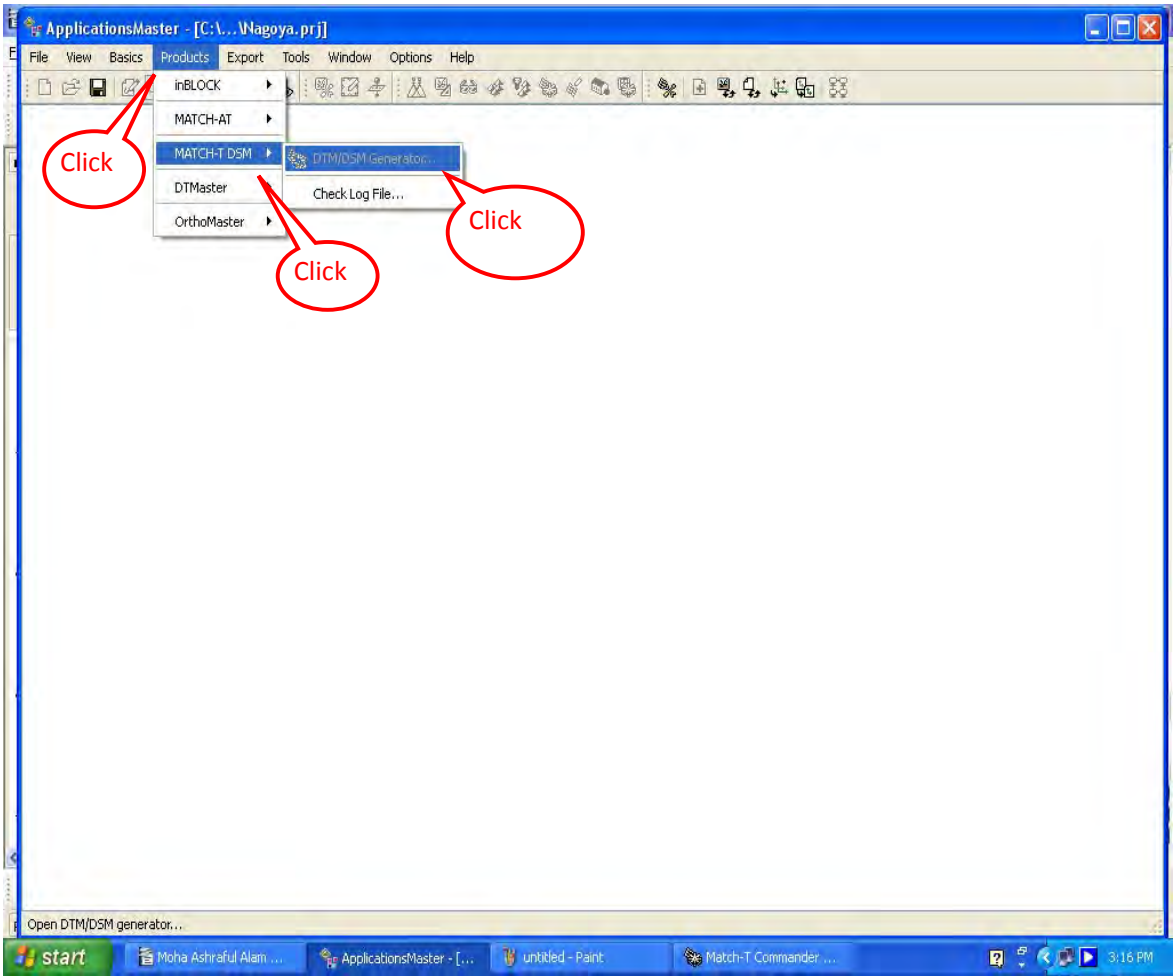
At the end of the MATCH-T DSM/DTM processing, Close the MATCH-T DSM/DTM Commander and return to the Applications Master main window.

Operation Manual of DT Master

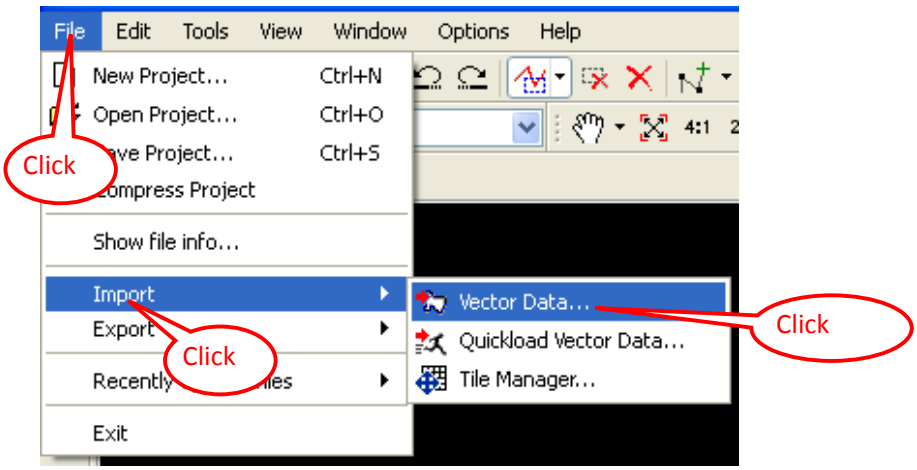
Contents of DT Master

1. Products: DT Master: DTM \ DSM Editors ……1
2. File Import……2
3. Select Input Format……2
4. Add: Operator Work Select:……2
5. Data Import 1 ……4
6. Data Import 2 ……4
7. Import finish……5
8. EDIT IMG: Display On/Off ……5
9. Image select ……6
10. Select New File and Name DTM-Edit……6
11. Given File Name to DTM-Edit……7
12. Click Add --> Add Single Layer ……7
13. File Name, Mass point, Color & Type select 1……7
14. File Name, Break Line, Color & Type Select 2……8
15. Best-Fit Stereo select……8
16. Start Edit first from “Breakline” and next “Masspoints” ……8

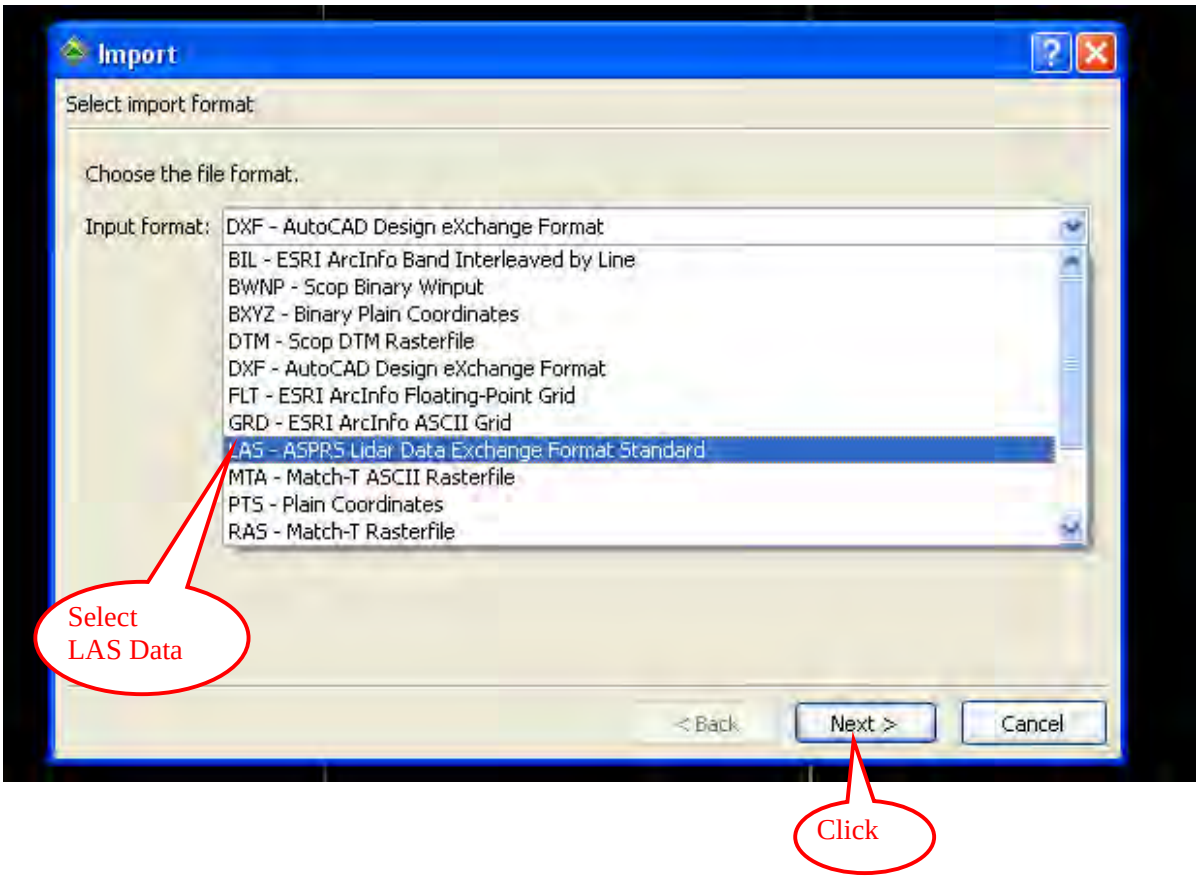
1. Products: DT Master: DTM \ DSM Editors:



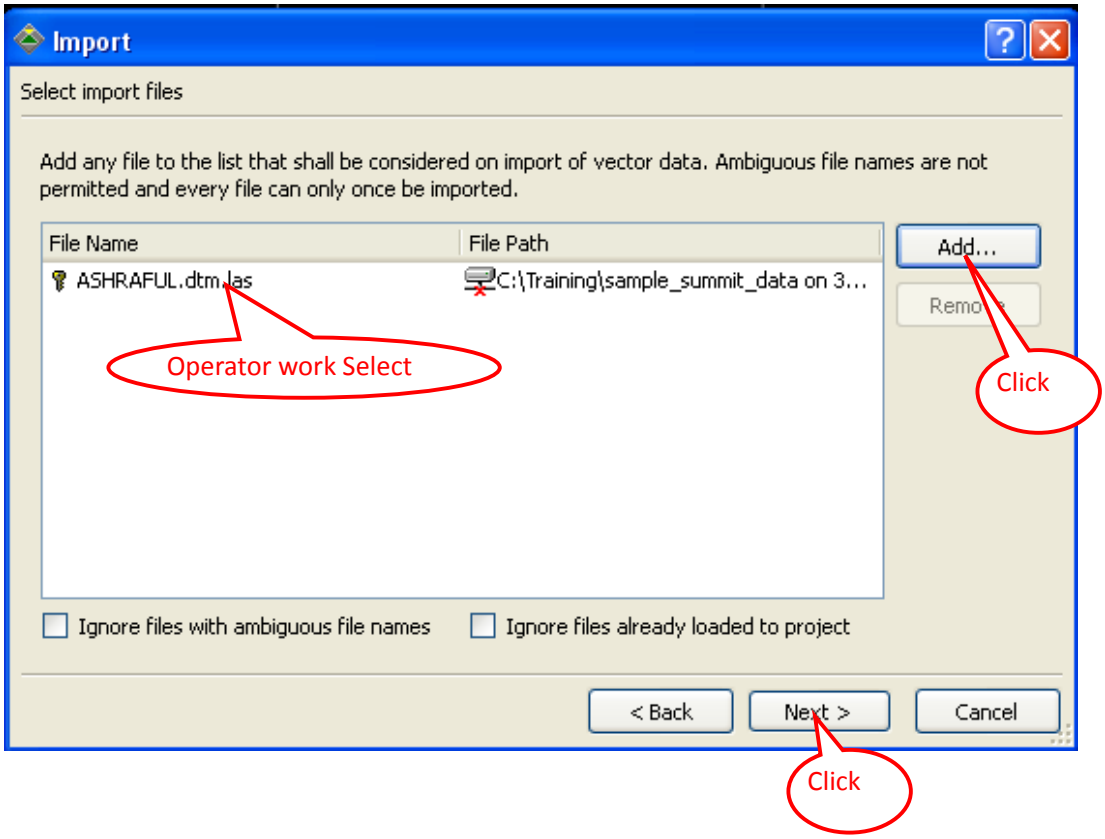
2. File Import:

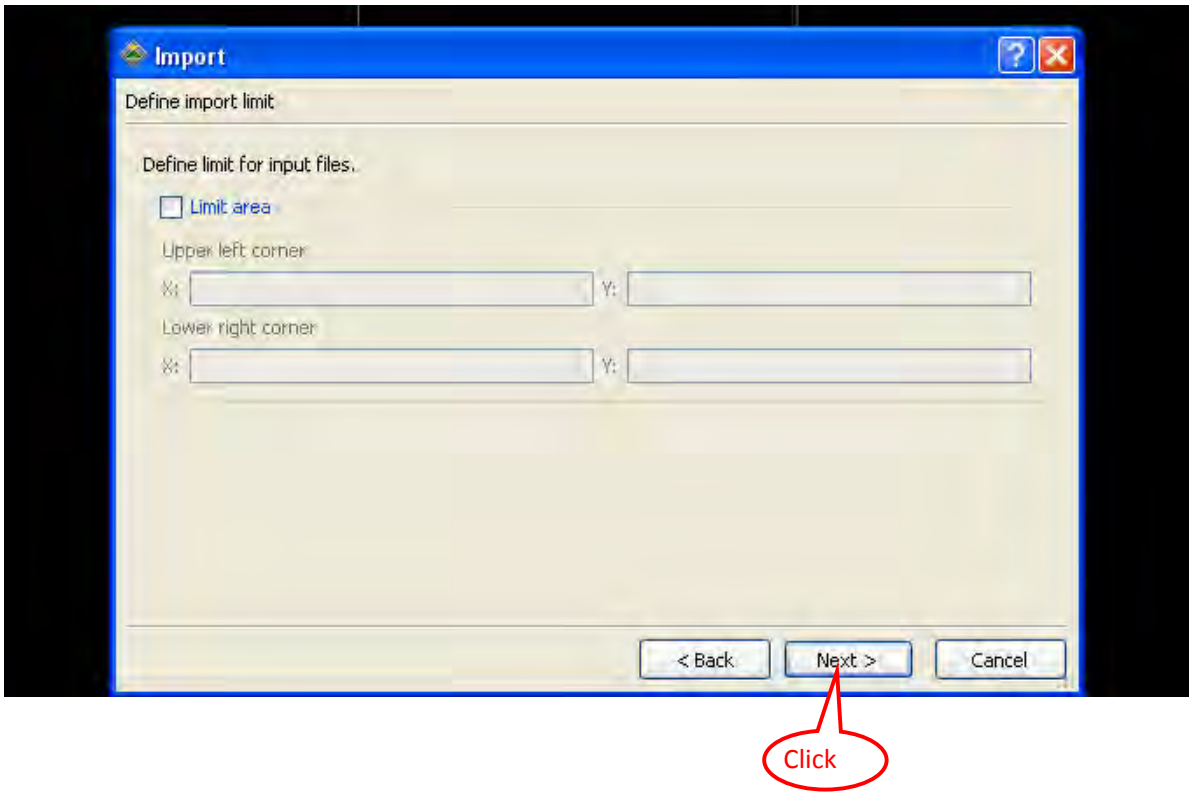


3. Select Input Format:

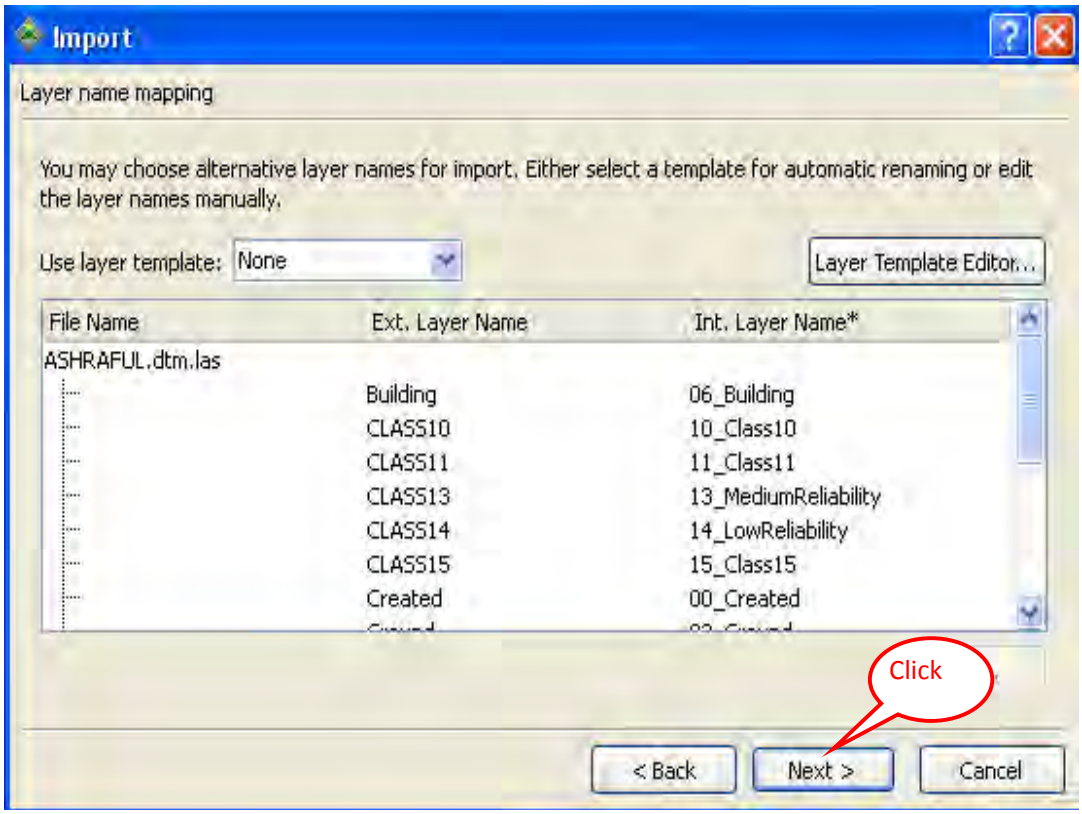


4. Add: Operator Work Select:

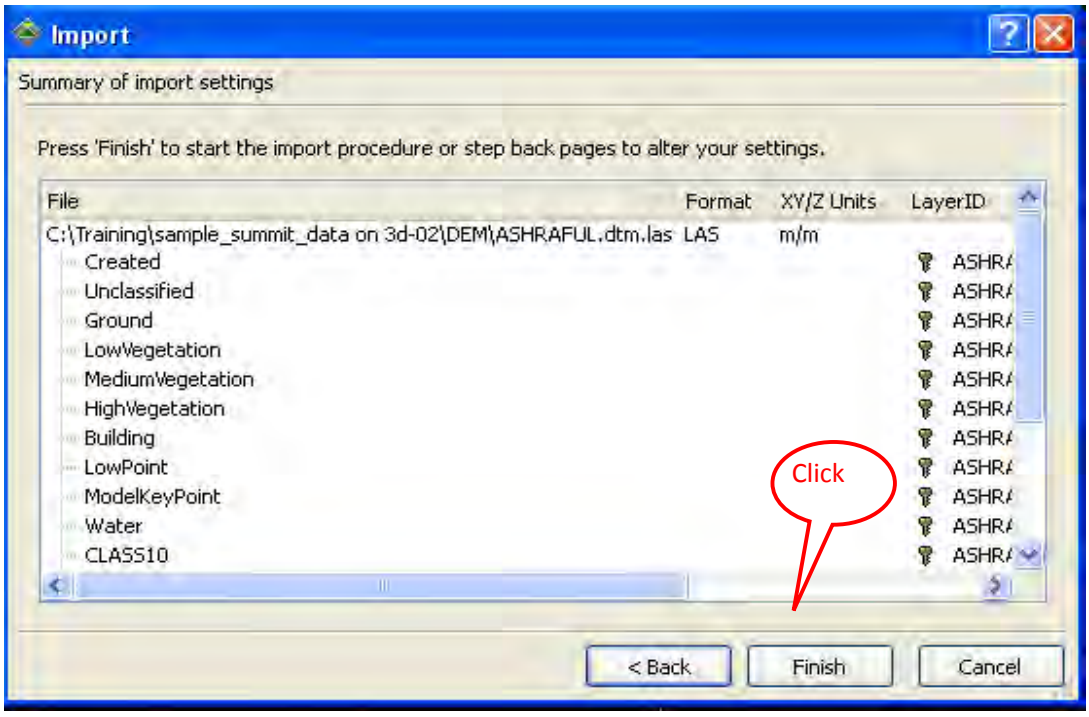




5. Data import 1:

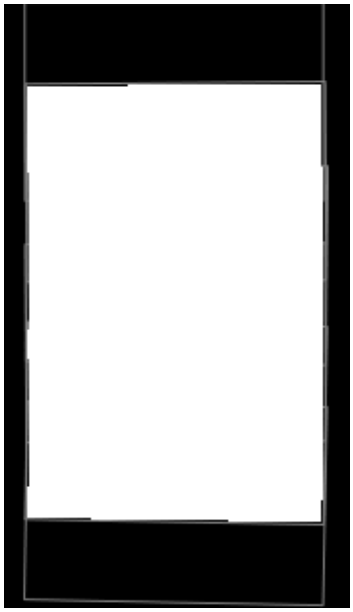


6. Data import 2

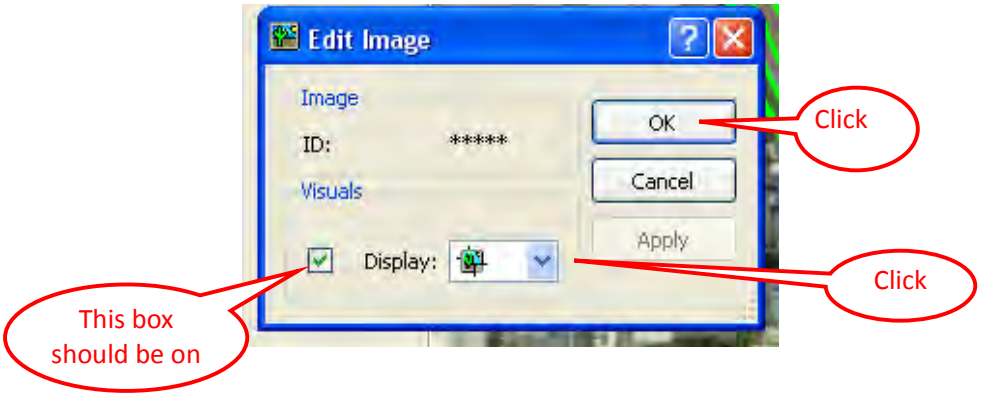


7. Import finish

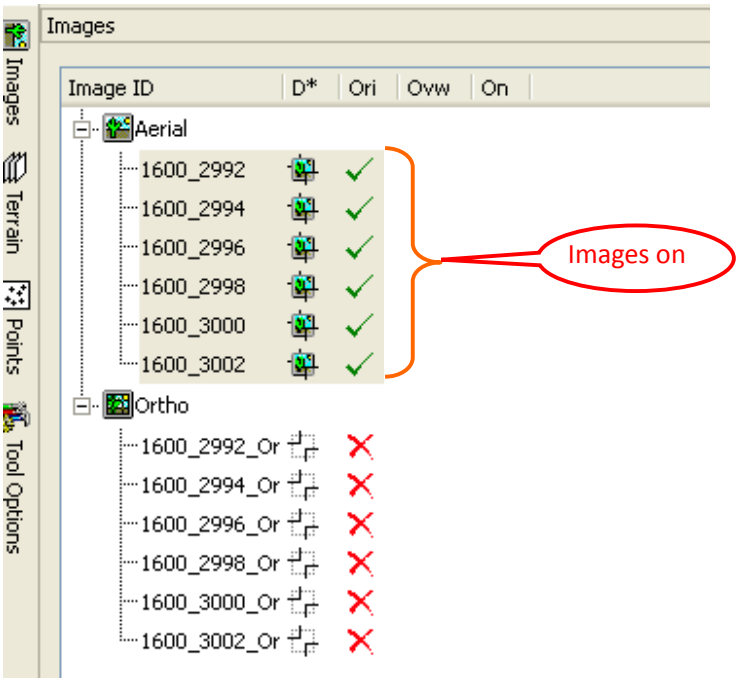
DTM Point will be shown in the Monitor



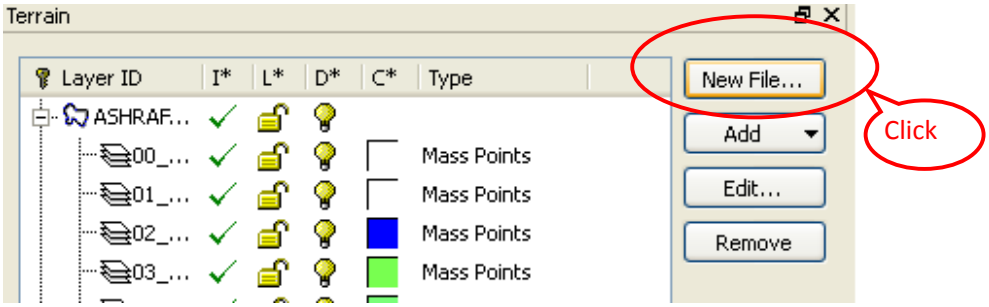
8. EDIT IMG: Display On/Off



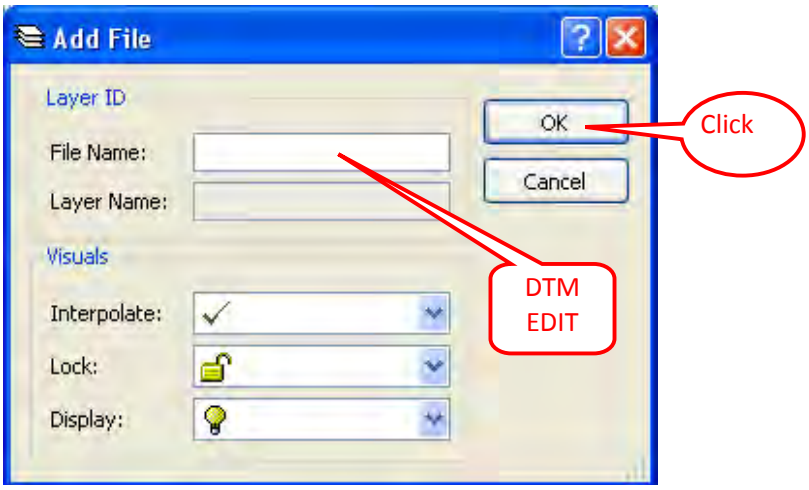
9. Image select:



10. Select New File and Name DTM-Edit

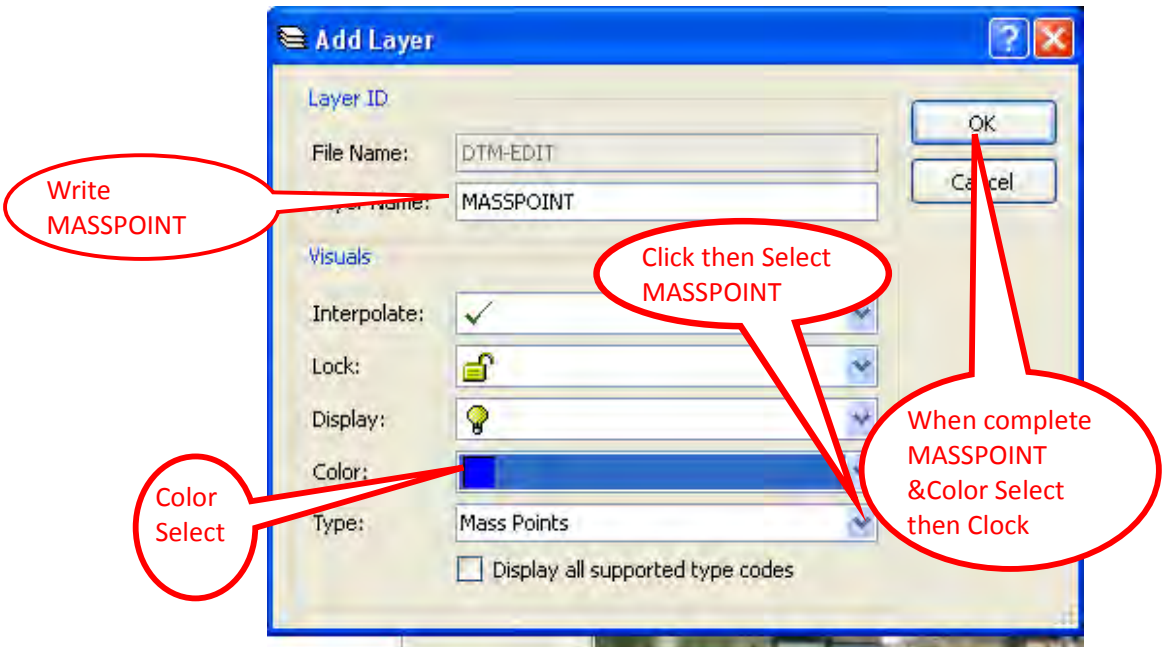


11. Given File Name to DTM-Edit

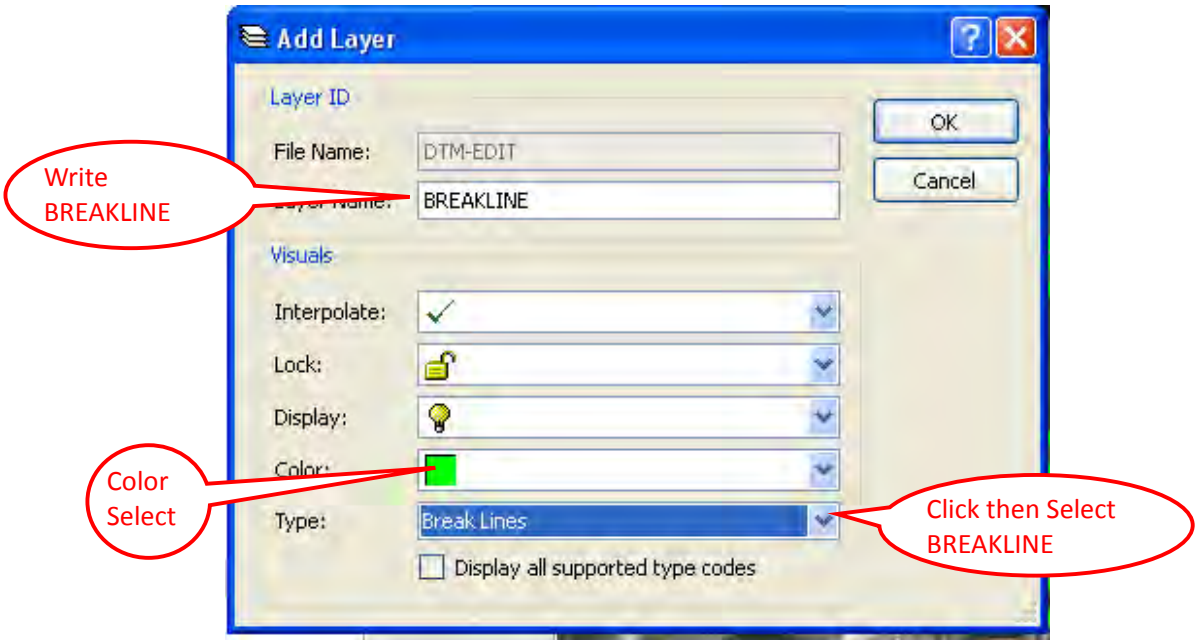


12. Click Add ⟶ Add Single Layer

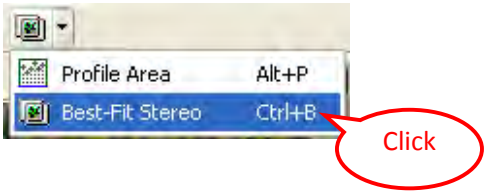
13. File Name, Mass point, Color & Type select 1:



14. File Name, Break Line, Color & Type Select 2:



15. Best-Fit Stereo select:



16. Start Edit first from “Breakline” and next “Masspoints”:

Ortho Master User Manual

August 2011

Contents of Ortho Master

1. Open File ····· 3

2. Edit File ····· 3

3. Cameras/Sensor Check ····· 4

4. Camera Check ····· 4

5. Frame Type Check ····· 5

6. In case of frame type problem ····· 5

7. Image Path ····· 6

8. Products ····· 6

9. Data Import → Height Model → DXF ····· 7

10. Browse ····· 7

11. BREAK LINE/MASS POINT Select ····· 8

12. DTM EDIT.dxf ····· 8

13. Parameter Setting ····· 9

14. File Name Select ····· 10

15. Click next until finish ····· 11

16. Select Ortho- Areas ····· 11

17. Setup parameter Check box on
"For Available images" and "Force Rectangular" ····· 12

18. Generate→ Start Orthophoto Generation ····· 12

19. Edit Image Generate ····· 13

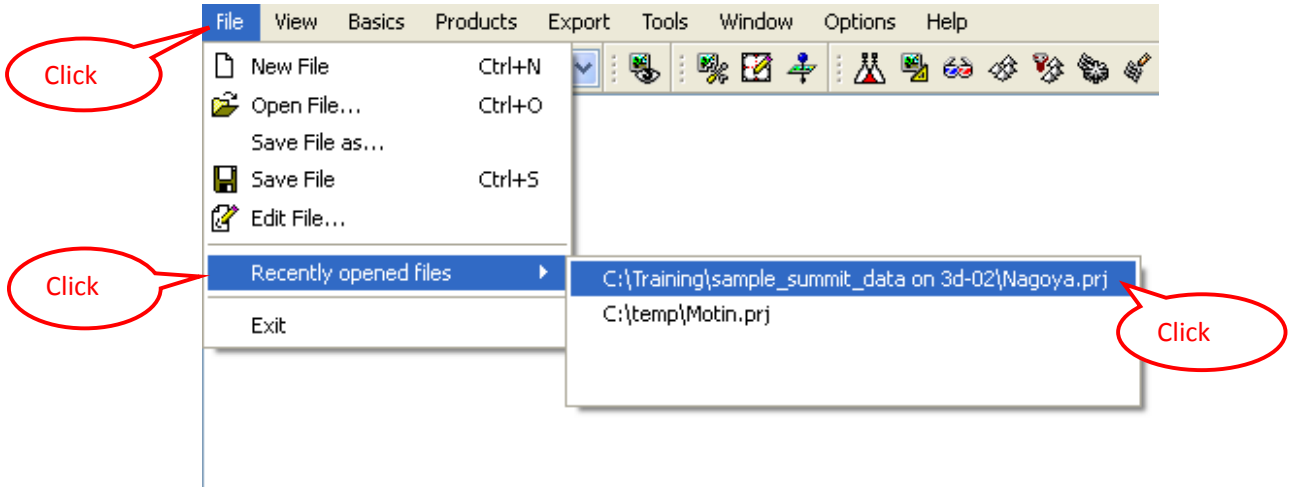
20. Parameter, Format, File & Block ····· 13

21. Start Orthophoto Processing by click Run ····· 14

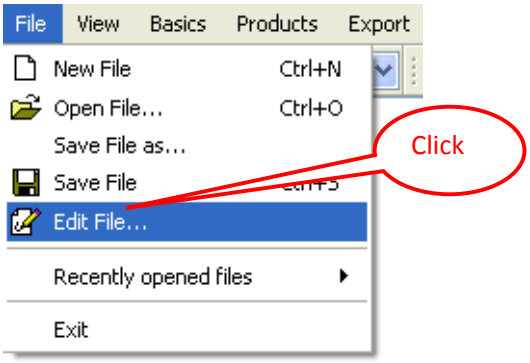
22. Ortho Master process ····· 14

23. Final Ortho photo ····· 15

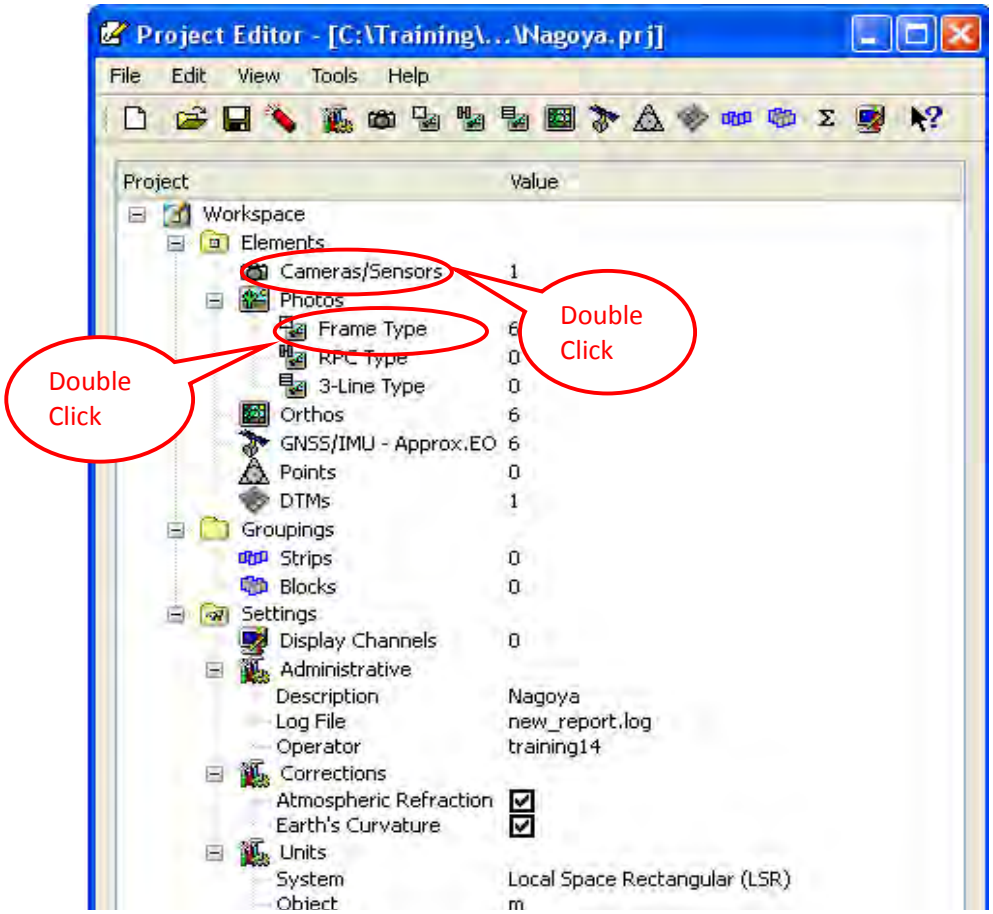
1. Open File:



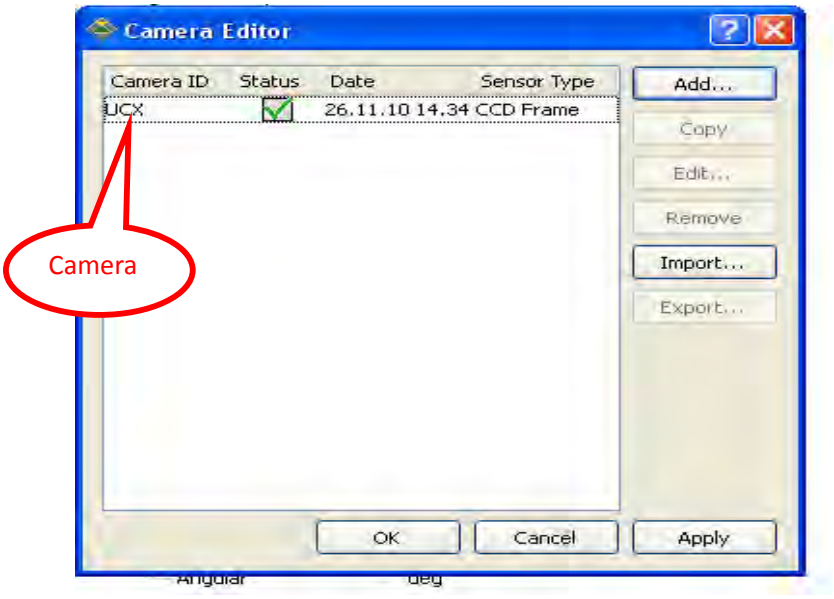
2. Edit File:



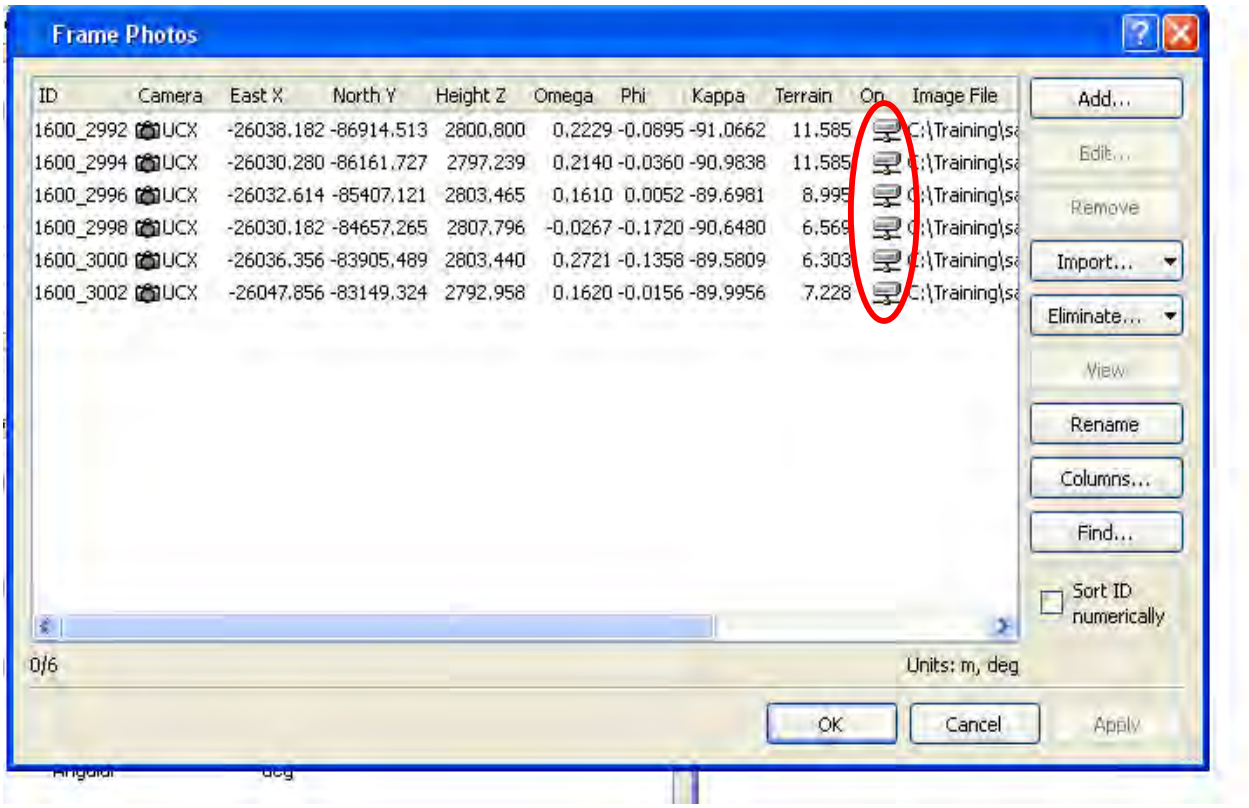
3. Cameras/Sensor Check:



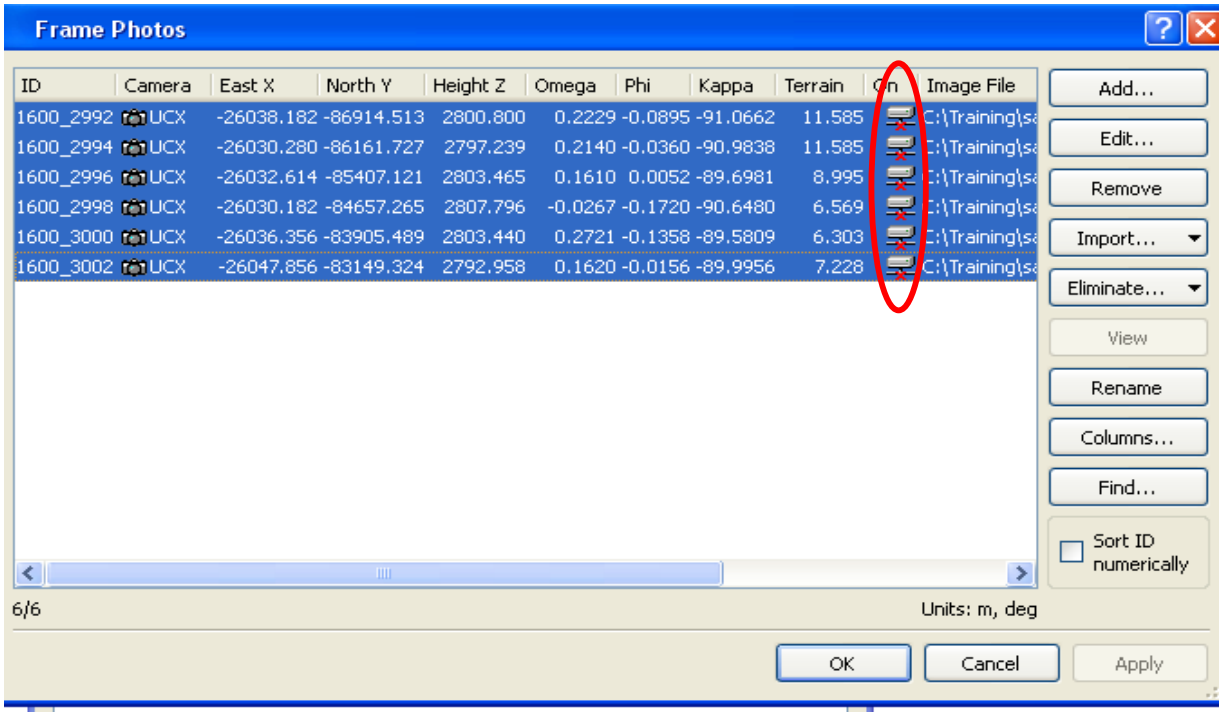
4. Camera Check:



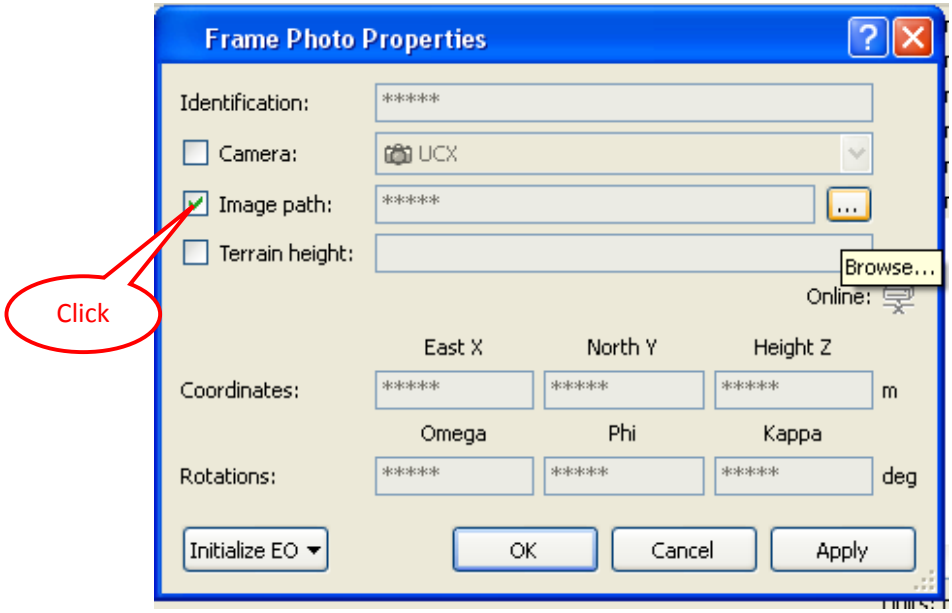
5. Frame Type Check:



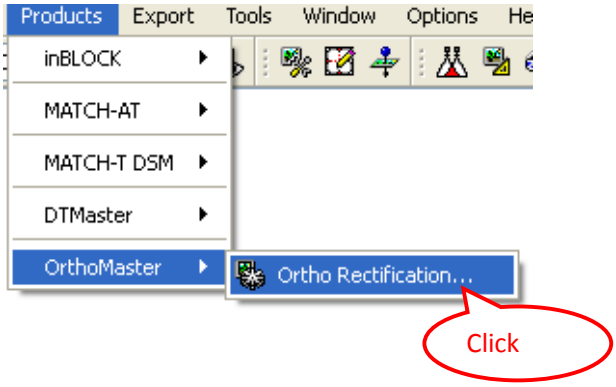
6. In case of frame type problem:



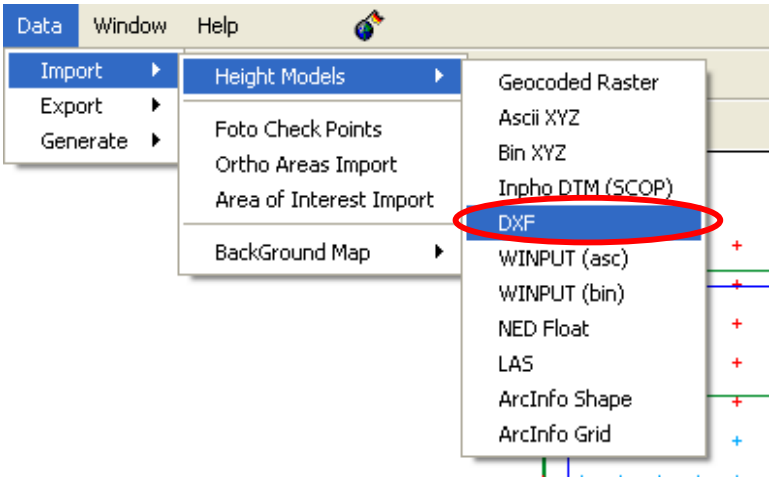
7. Image Path:



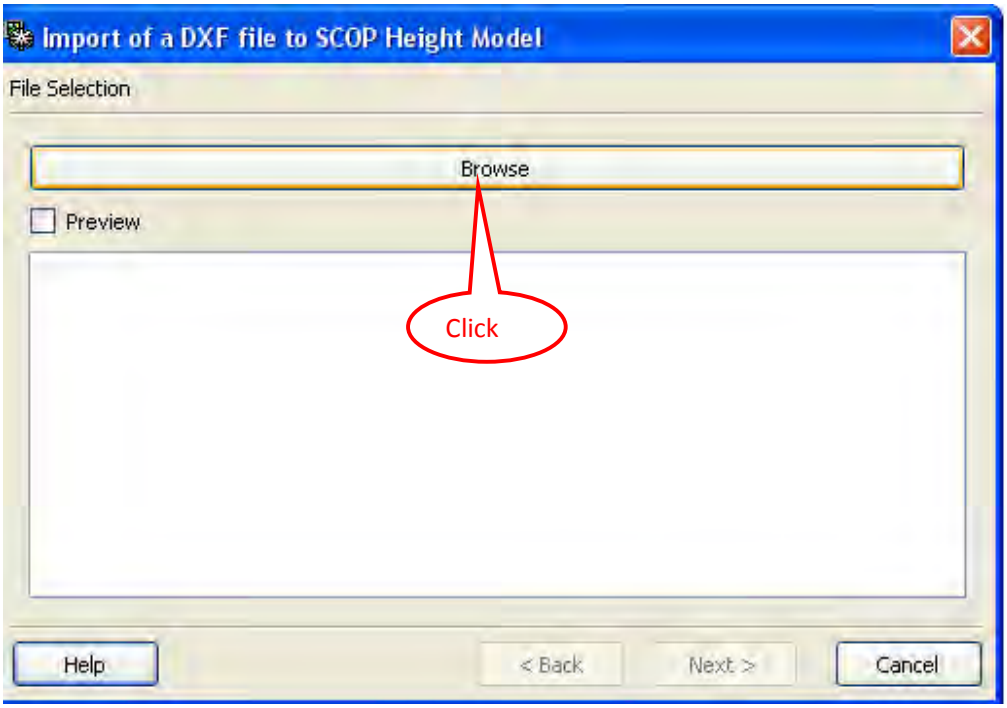
8. Products:



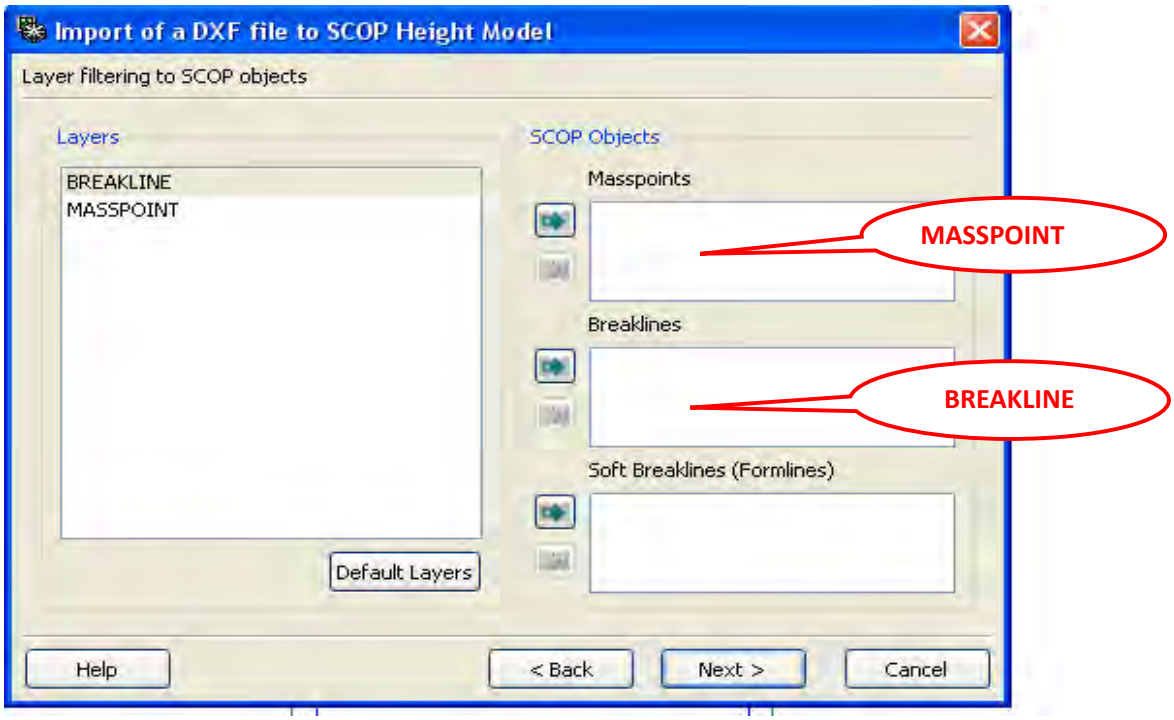
9. Data Import ⟶ Height Model ⟶ DXF



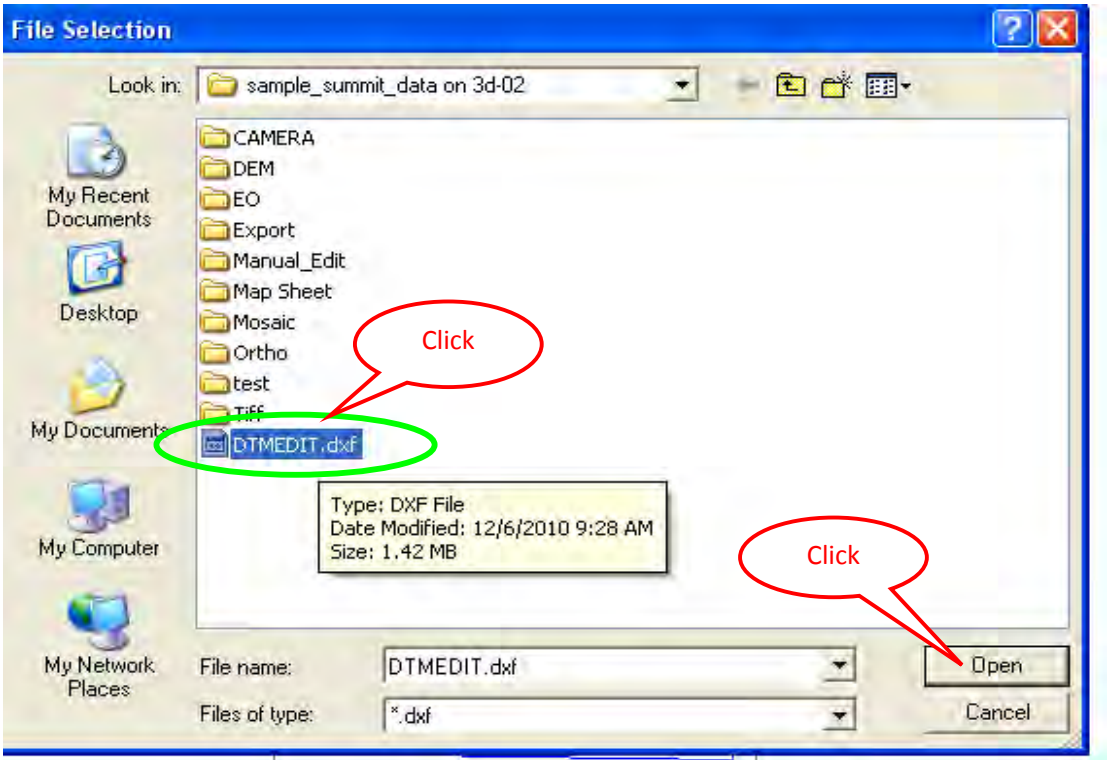
10. Browse:



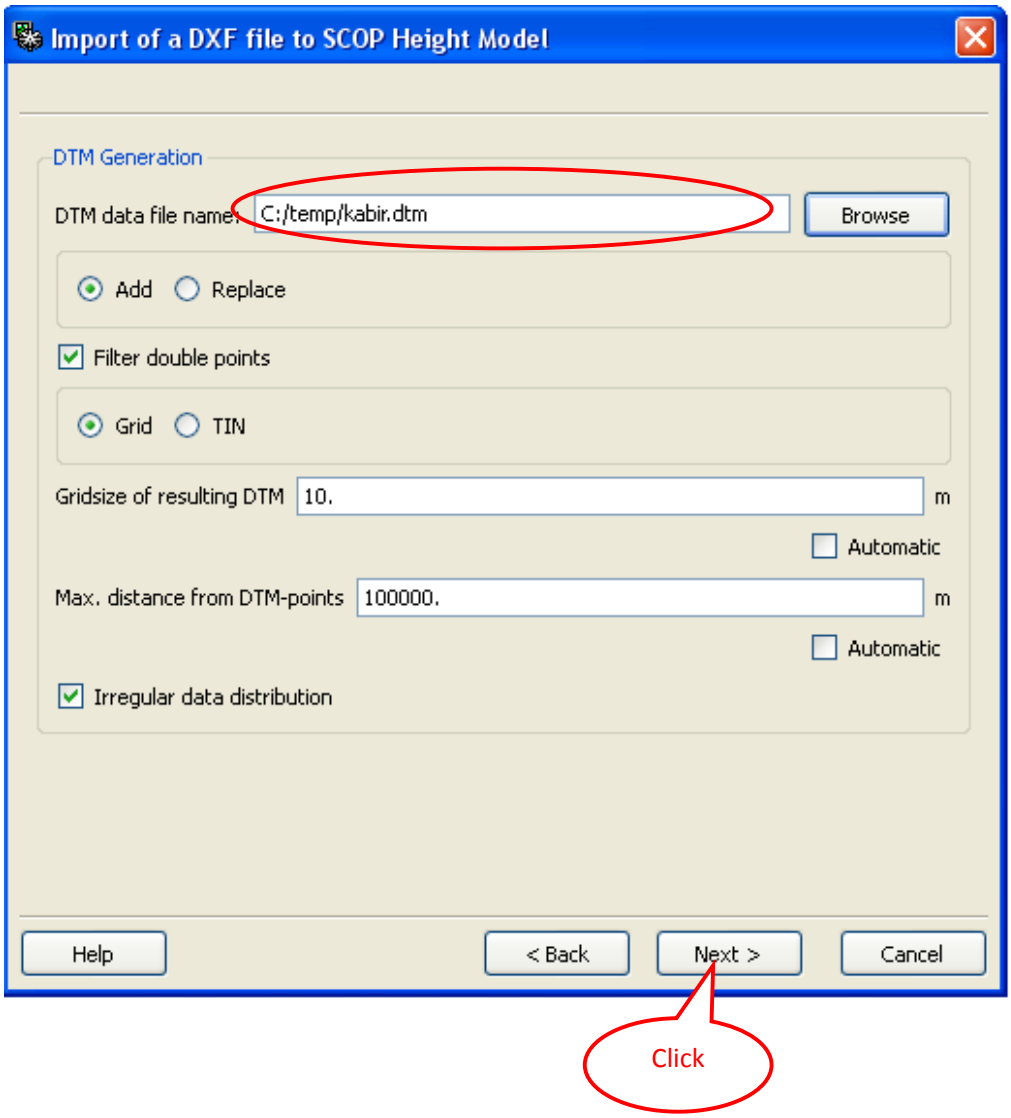
11. BREAK LINE/MASS POINT Select:



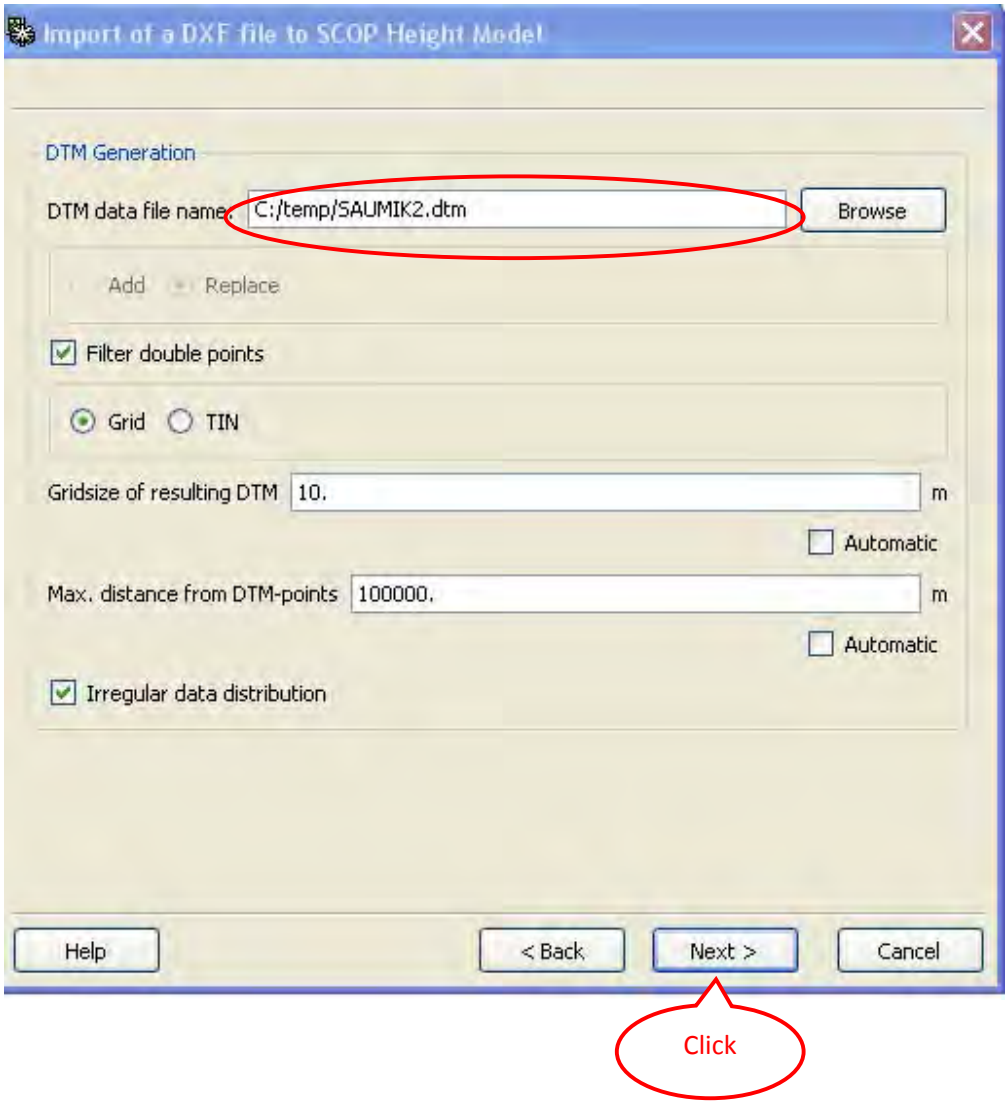
12. DTM EDIT.dxf :



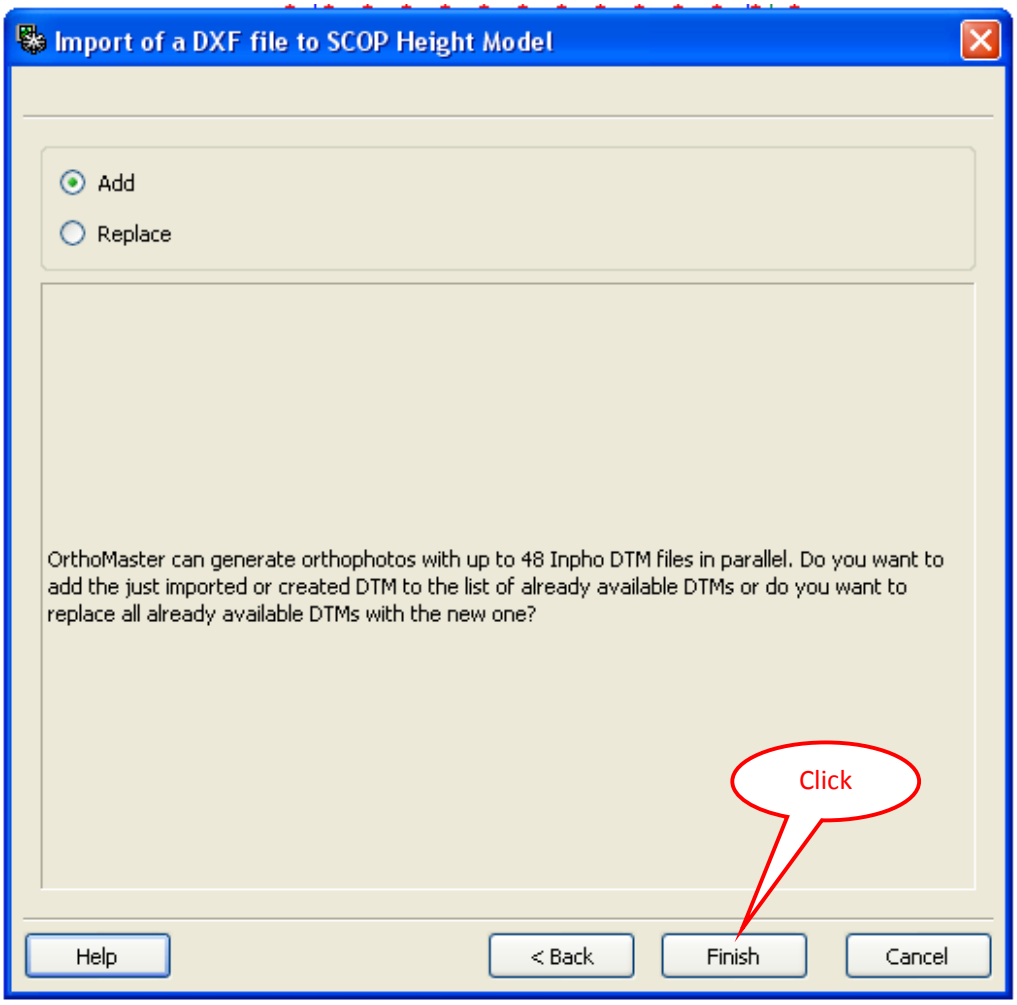
13. Parameter Setting:



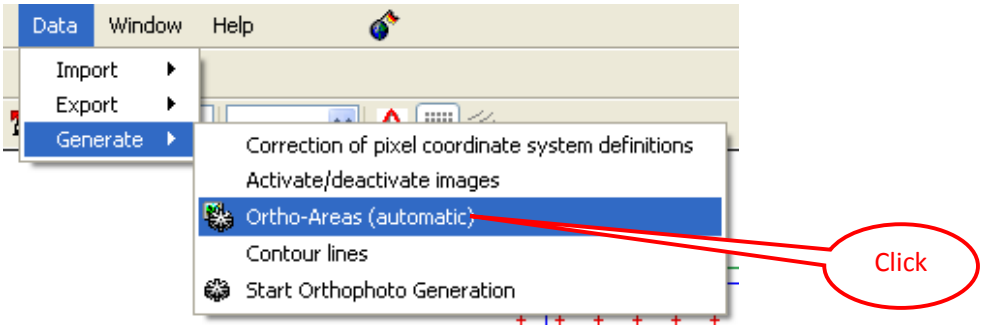
14. File Name Select:



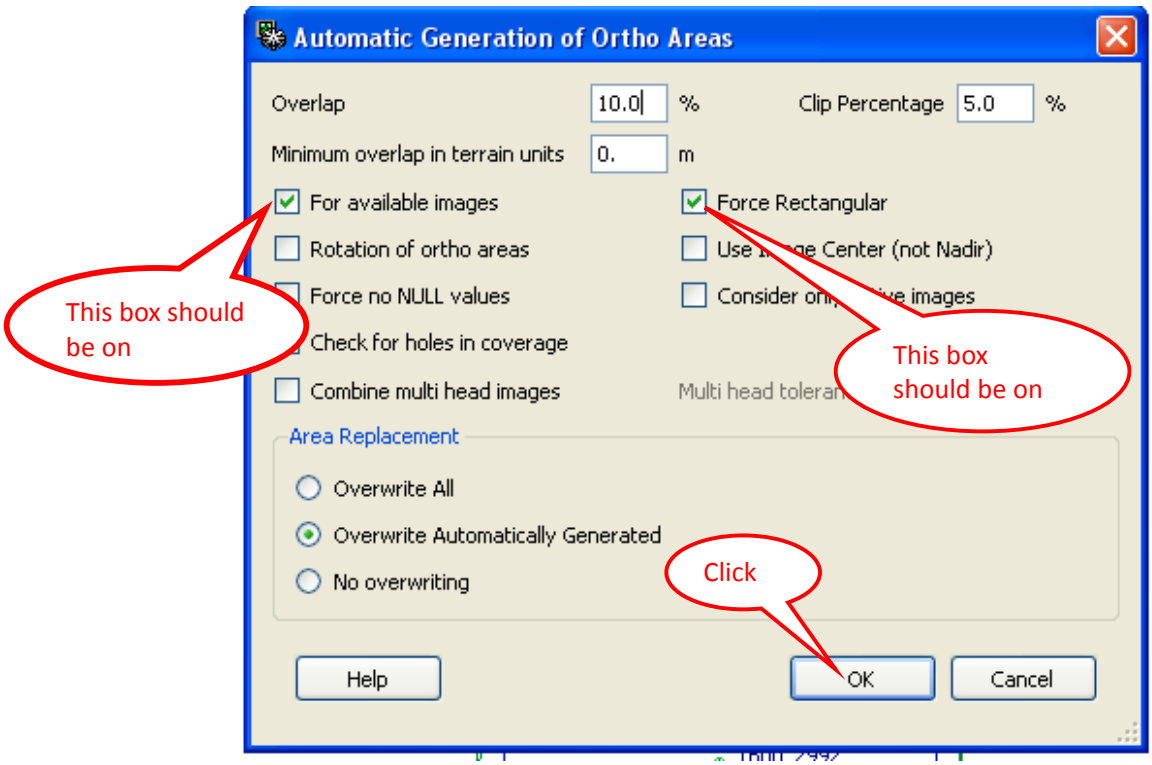
15. Click next until finish:



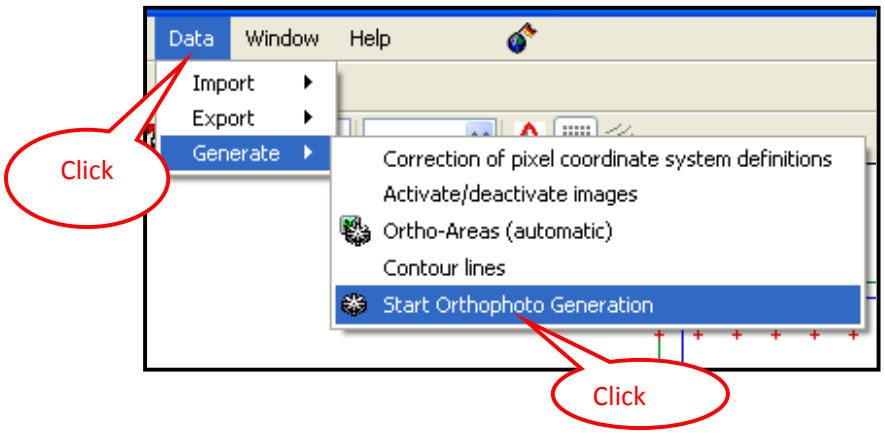
16. Select Ortho- Areas



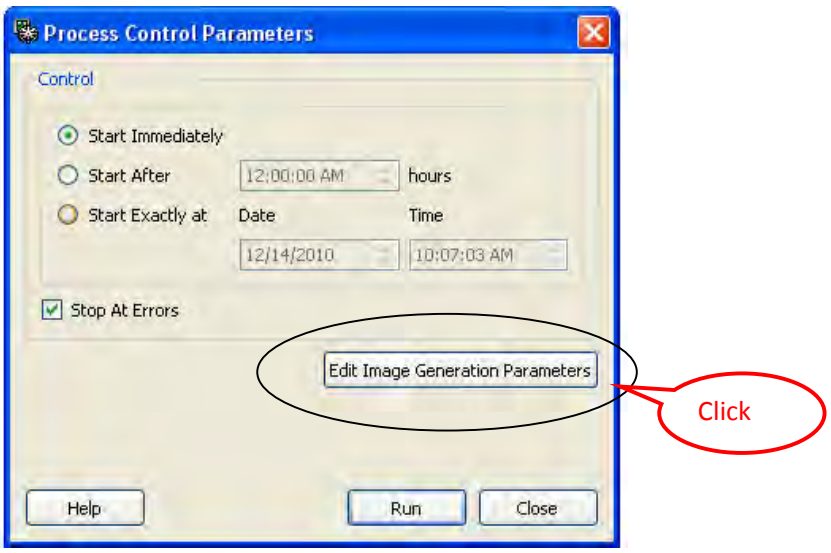
17. Setup parameter Check box on “For Available images” and “Force Rectangular”



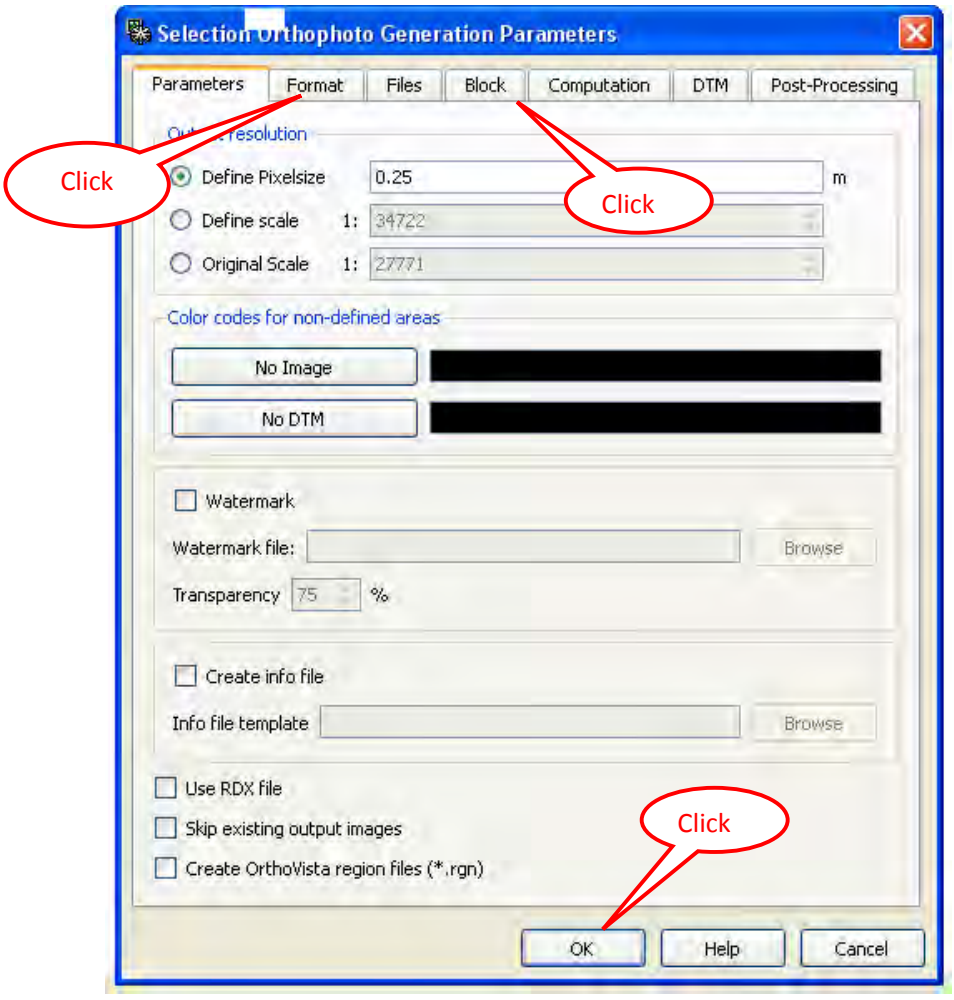
18. Generate ⟶ Start Orthophoto Generation



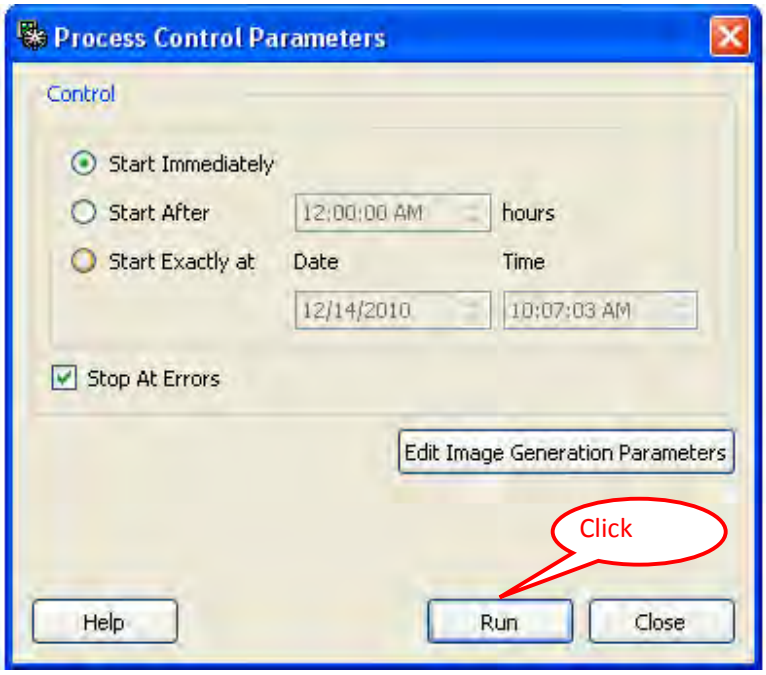
19. Edit Image Generate:



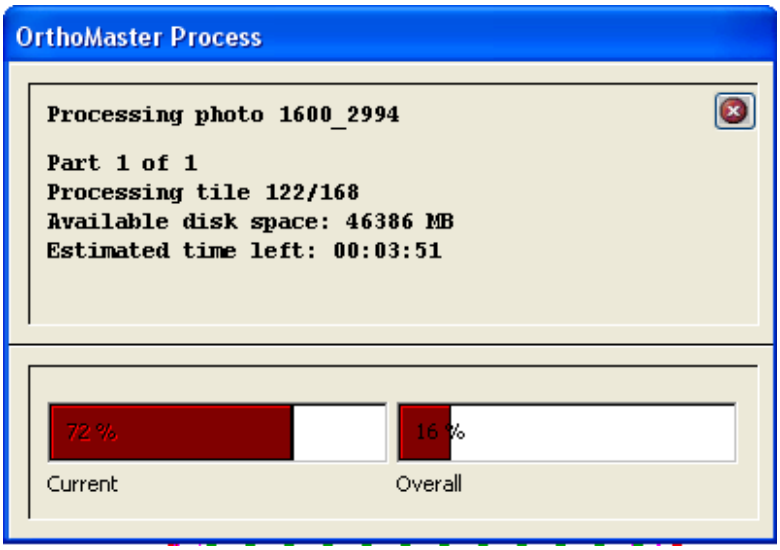
20. Parameter, Format, File & Block:



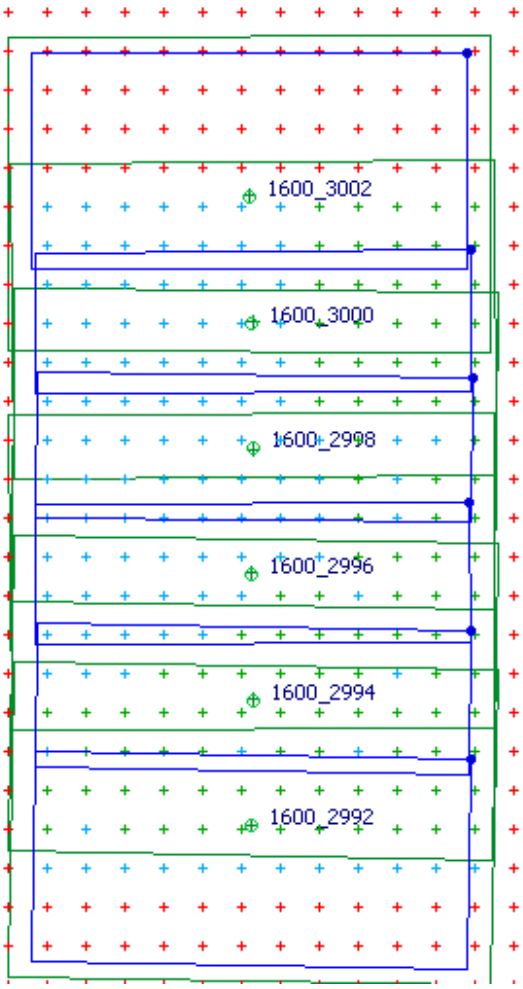
21. Start Orthophoto Processing by click Run



22. Ortho Master process:



23. Final Ortho photo



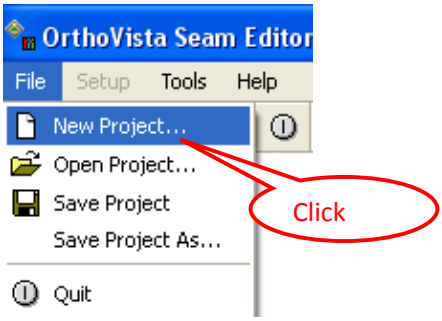
Ortho Vista Seam Editor User Manual

Contents of Ortho Vista Seam Editor

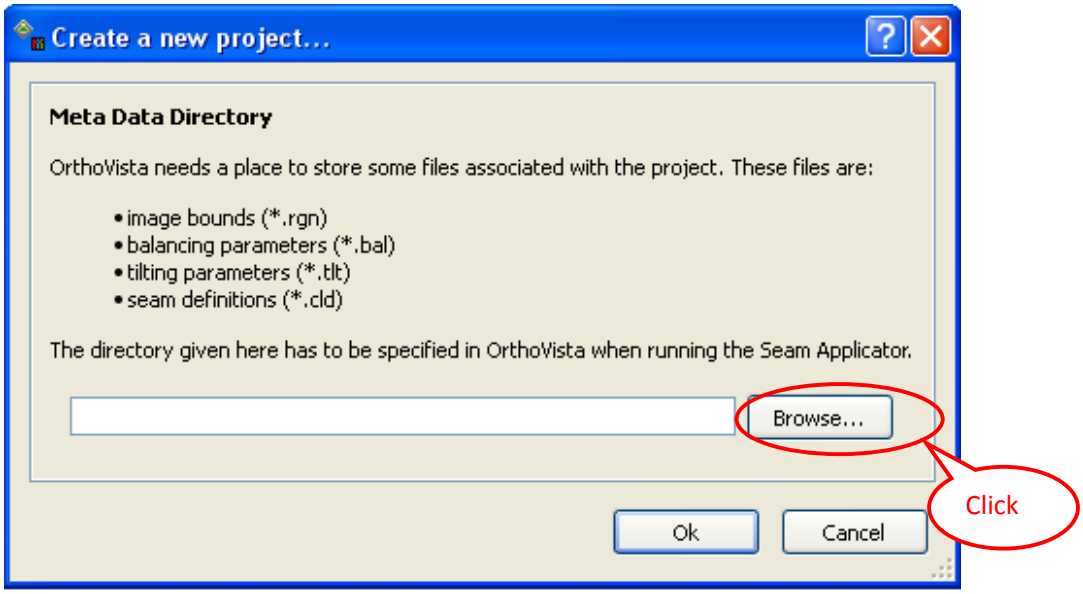
1. Seam Edit File Open ……15
2. Open New Project ……15
3. Click Browse ……15
4. Select Manual Edit Seamline ……16
5. Add a whole Directory Click……16
6. Auto Mosaic Selection……17
7. Project Directory Select:……17
8. Select Photo Image……18
9. Display Image ……18
10. Load Seam Line……19
11. Select Autoseam.dxf ……19
12. Open Seam Line Edit……20

1. Seam Edit File Open:

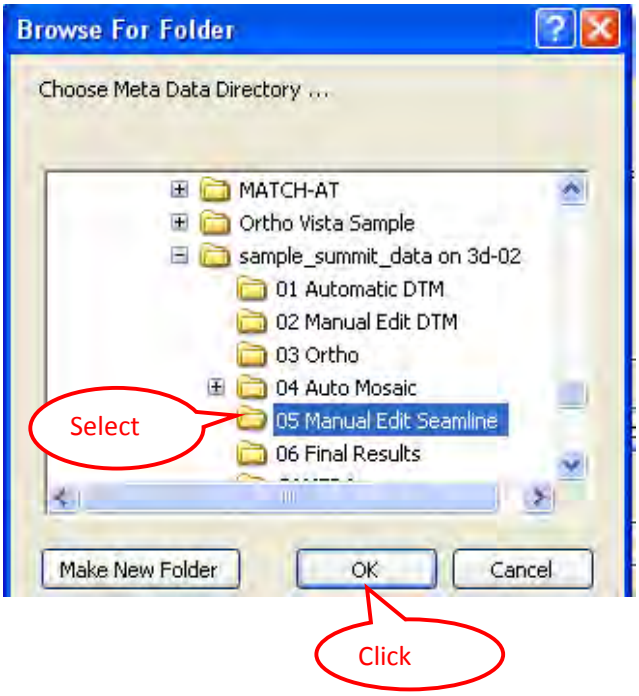
2. Open New Project:



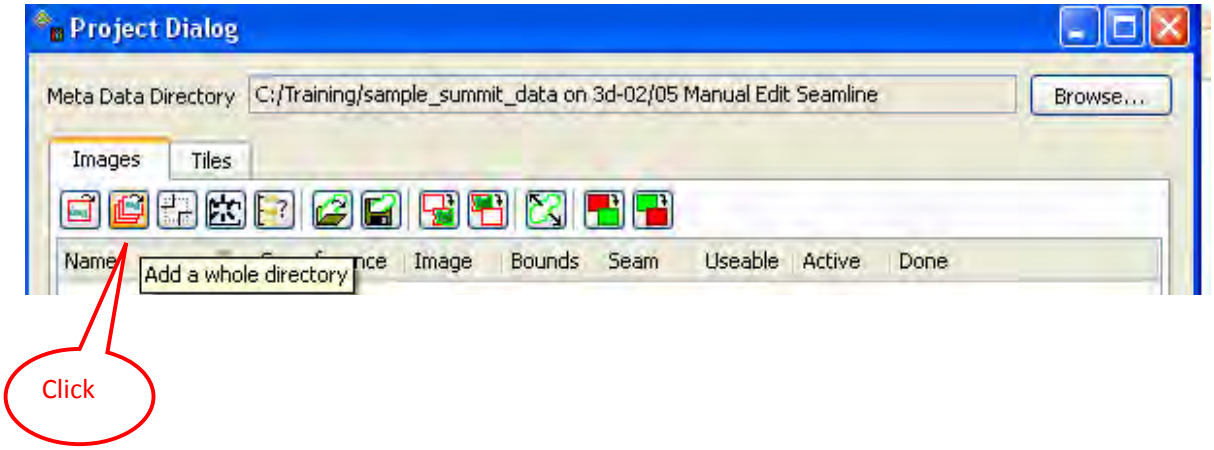
3. Click Browse:



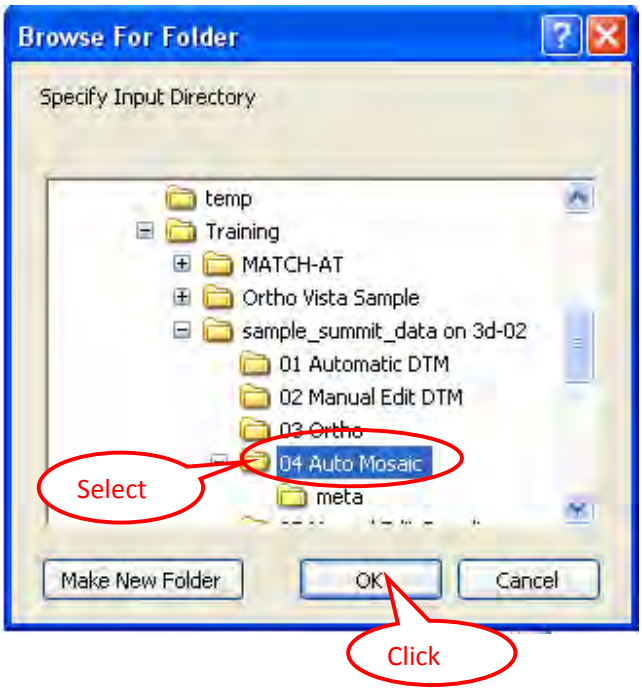
4. Select Manual Edit Seamline:



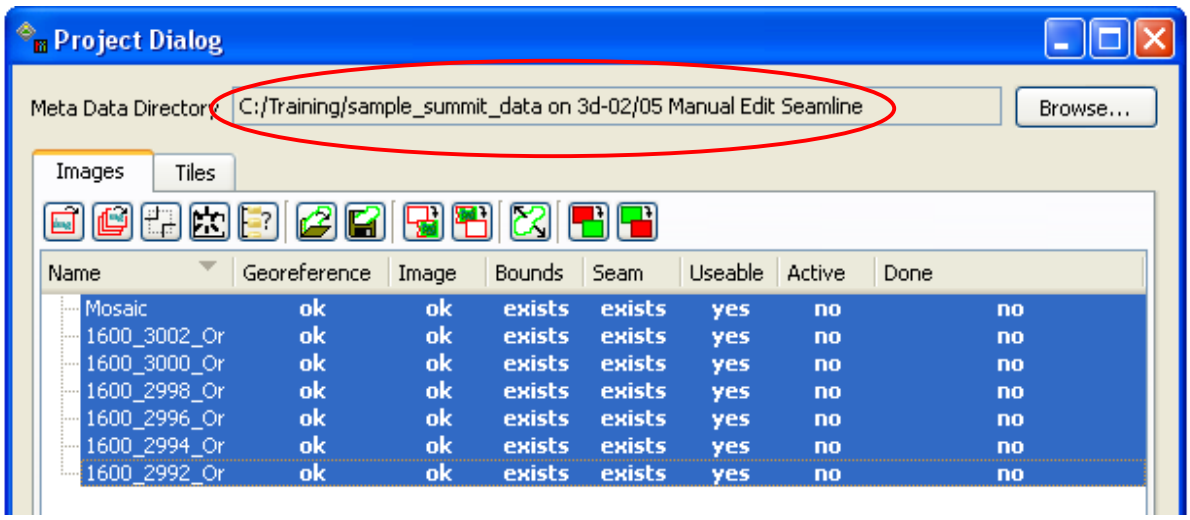
5. Add a whole Directory Click:



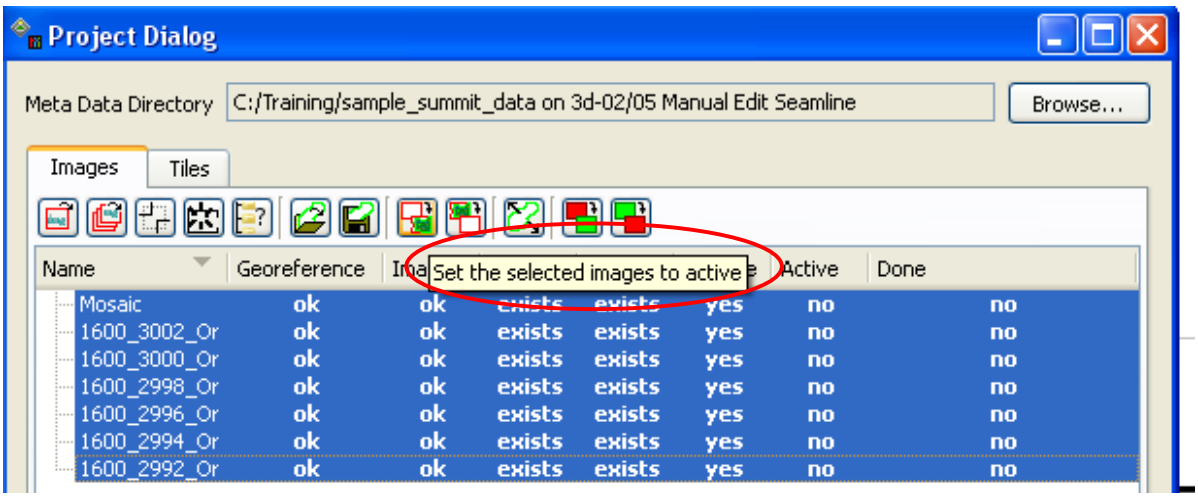
6. Auto Mosaic Selection:



7. Project Directory Select:

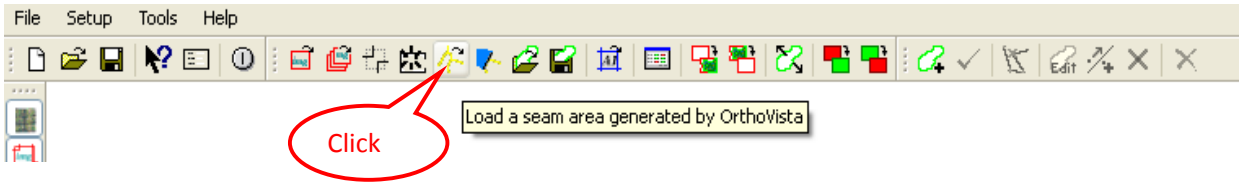


8. Select Photo Image:

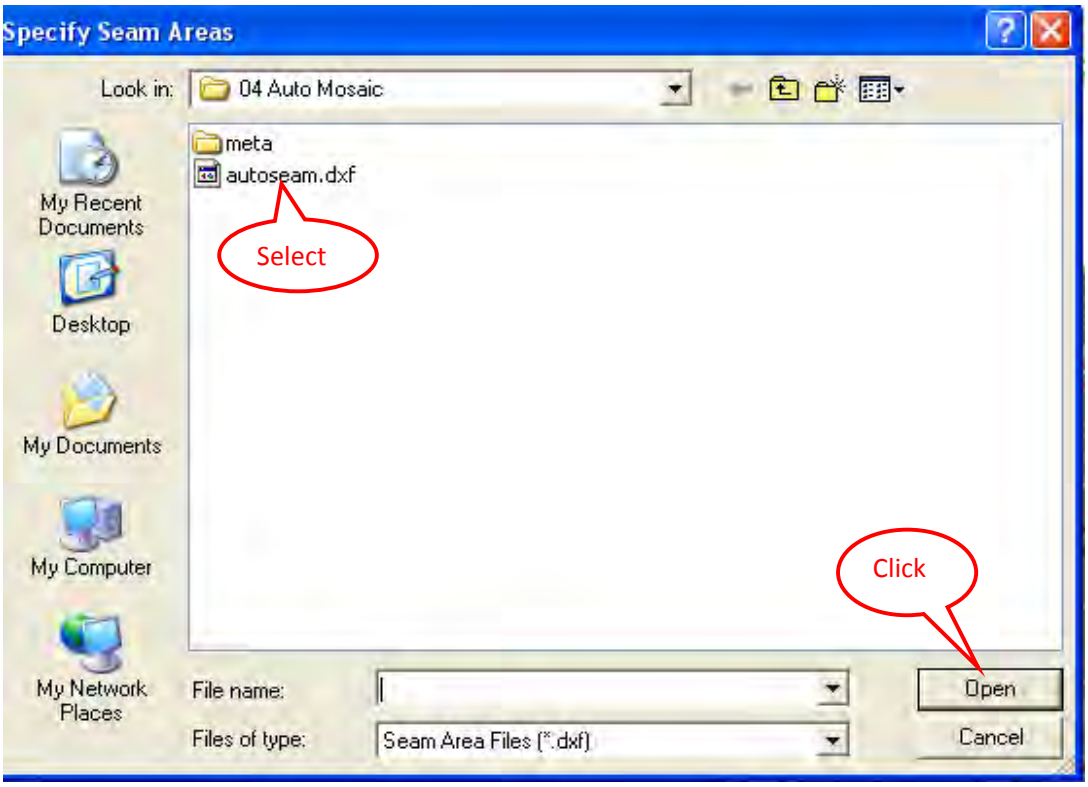


9. Display Image:

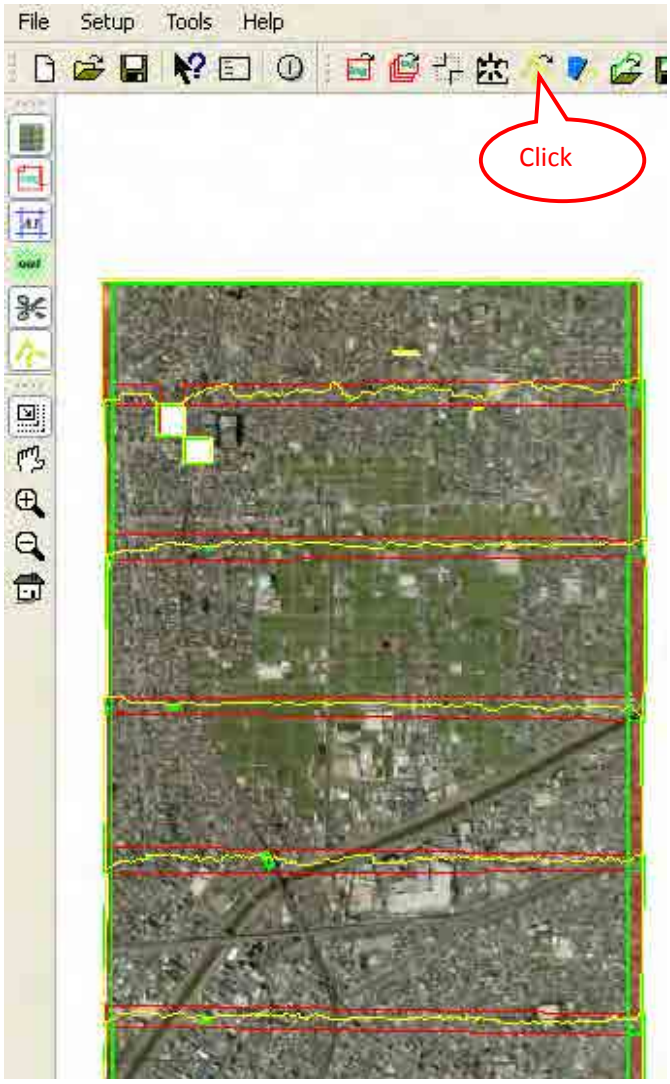
10. Load Seam Line:



11. Select Autoseam.dxf:



12. Open Seam Line Edit:

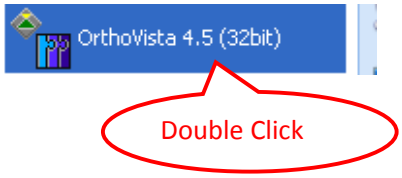


Ortho Vista Final Processing

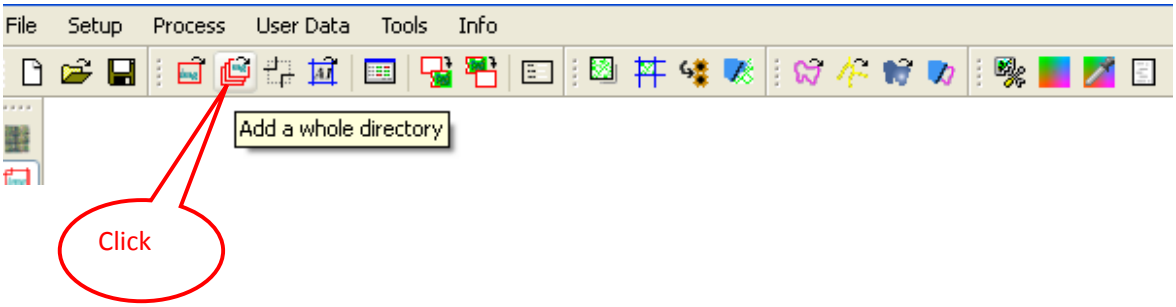
Contents of Ortho Vista Final Processing

1. Open “Ortho Vista” ……22
2. Add a whole directory ……22
3. Select Training ……22
4. Select Auto Mosaic……23
5. Photo frame……23
6. Display Image ……24
7. Select Load Tile Definitions File ……24
8. Write File Name ……25
9. Select Training ……25
10. Select Sample summit data ……26
11. Select Map sheet ……26
12. Select “Map Sheet” ……27
13. Select Area……27
14. Start “Begin Process” ……28
15. Close and process……29
16. Check Final Map by open the automatic seam to find modify area…29

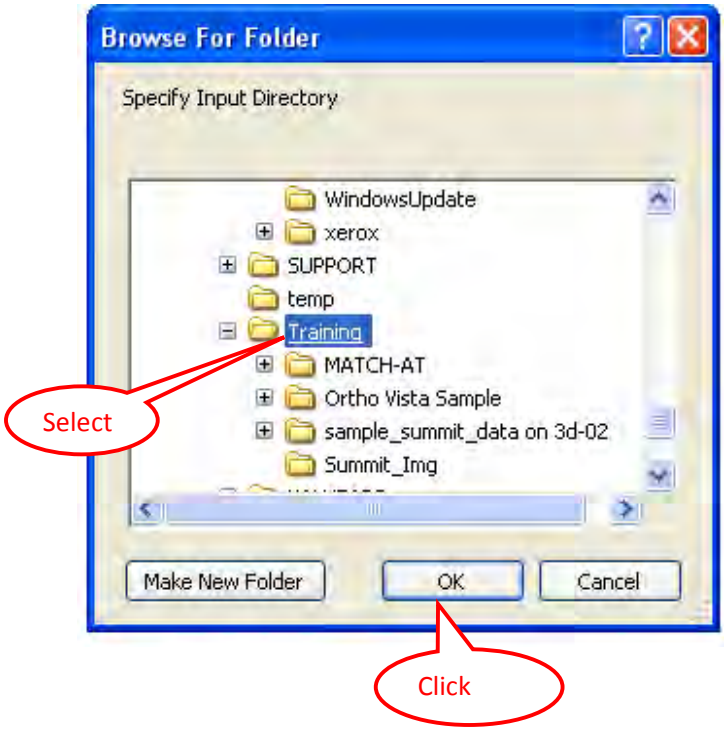
1. Open “Ortho Vista”:



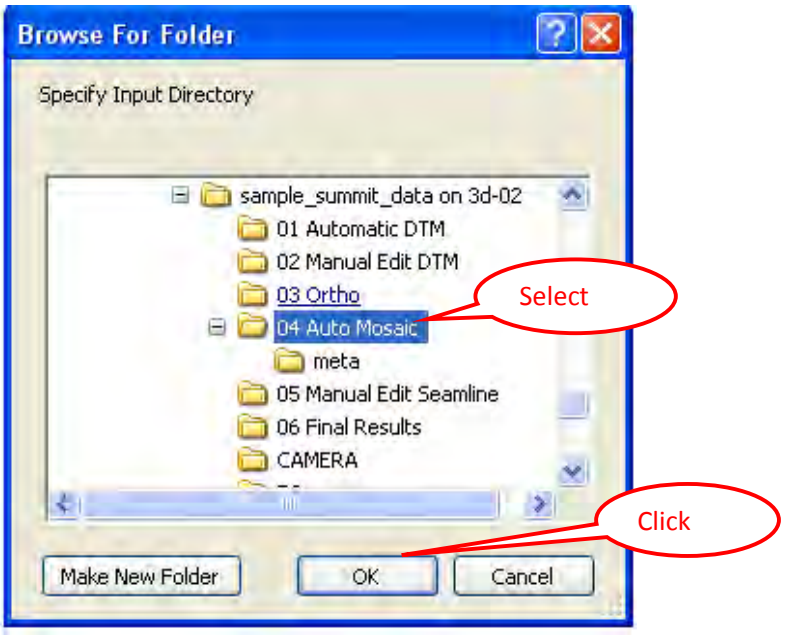
2. Add a whole directory:



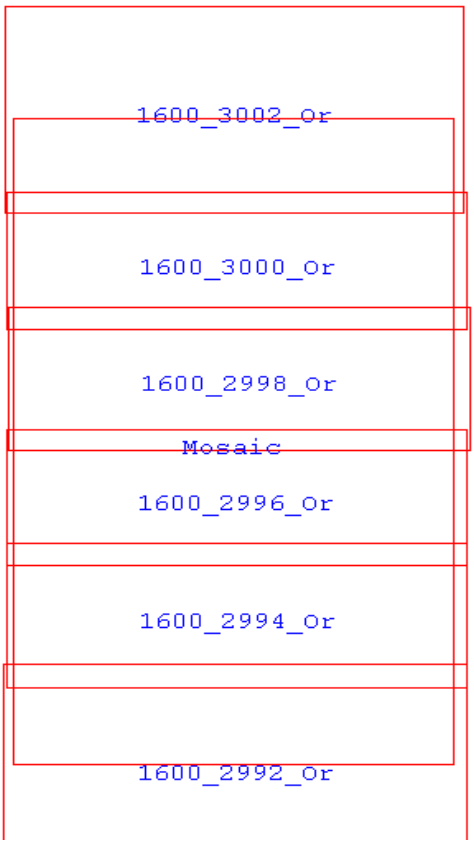
3. Select Training



4. Select Auto Mosaic:

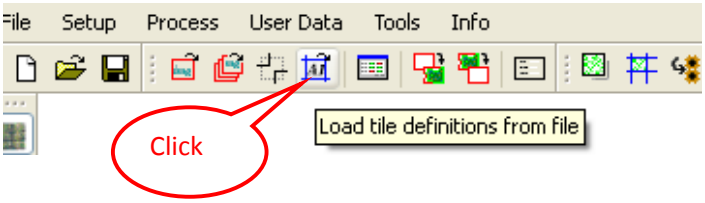


5. Photo frame:

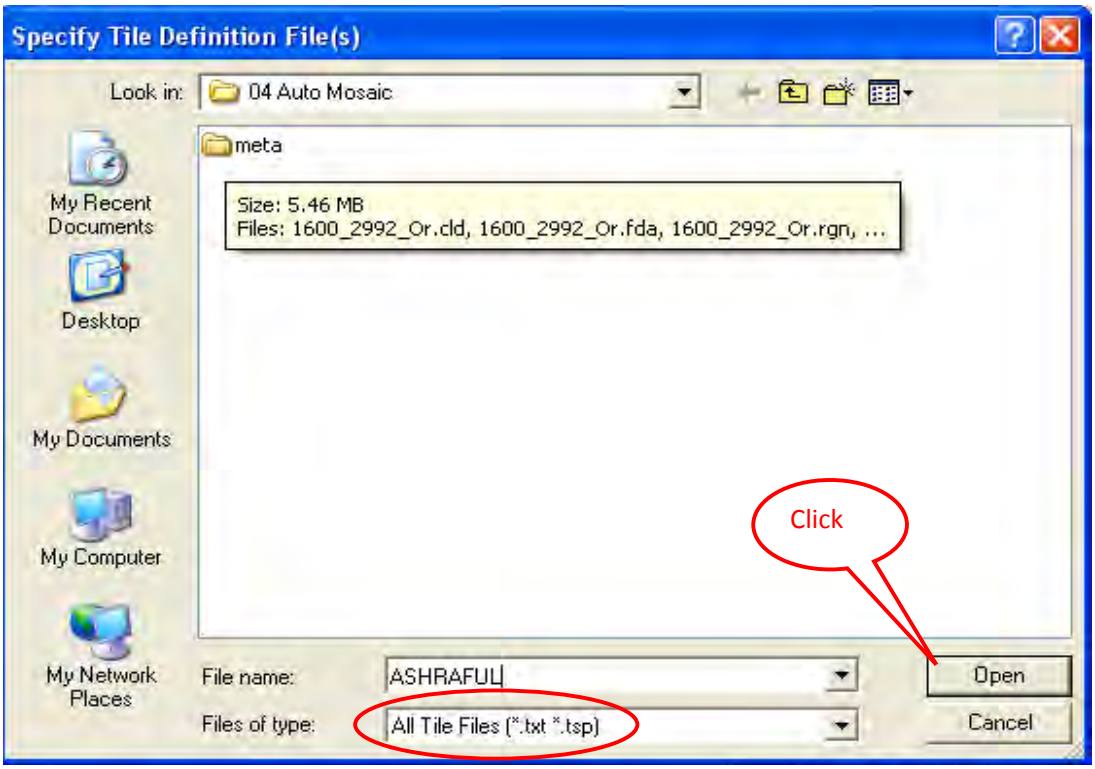


6. Display Image:

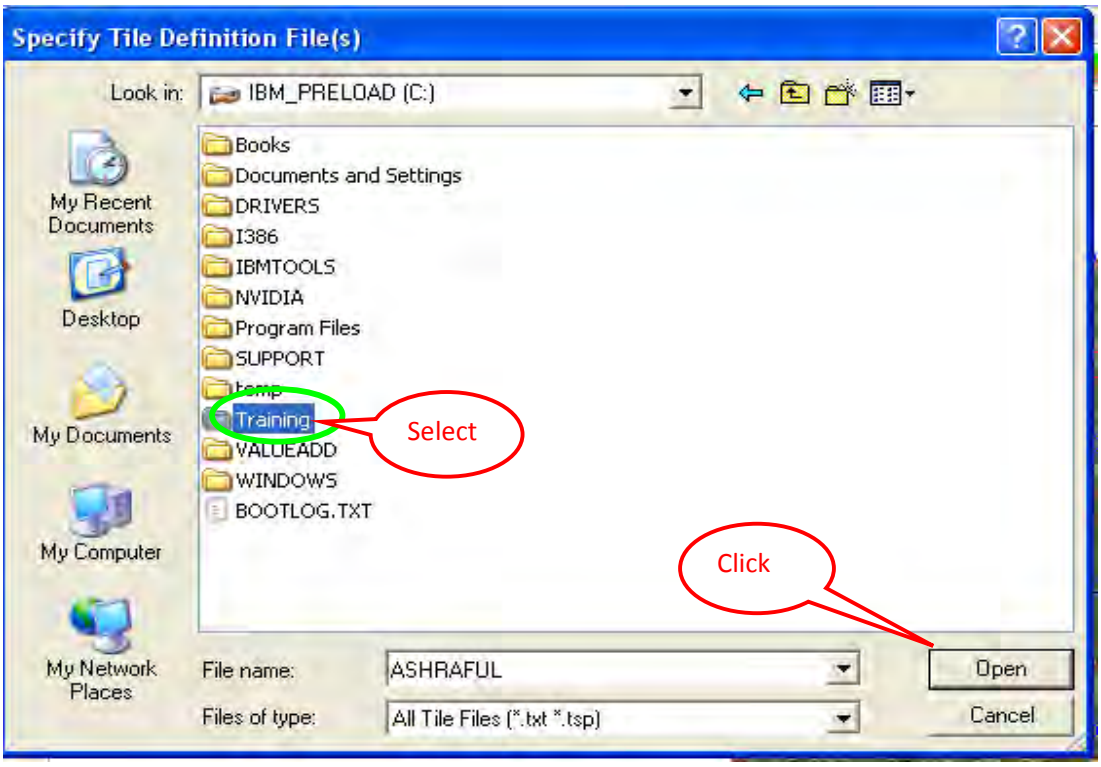
7. Select Load Tile Definitions File:



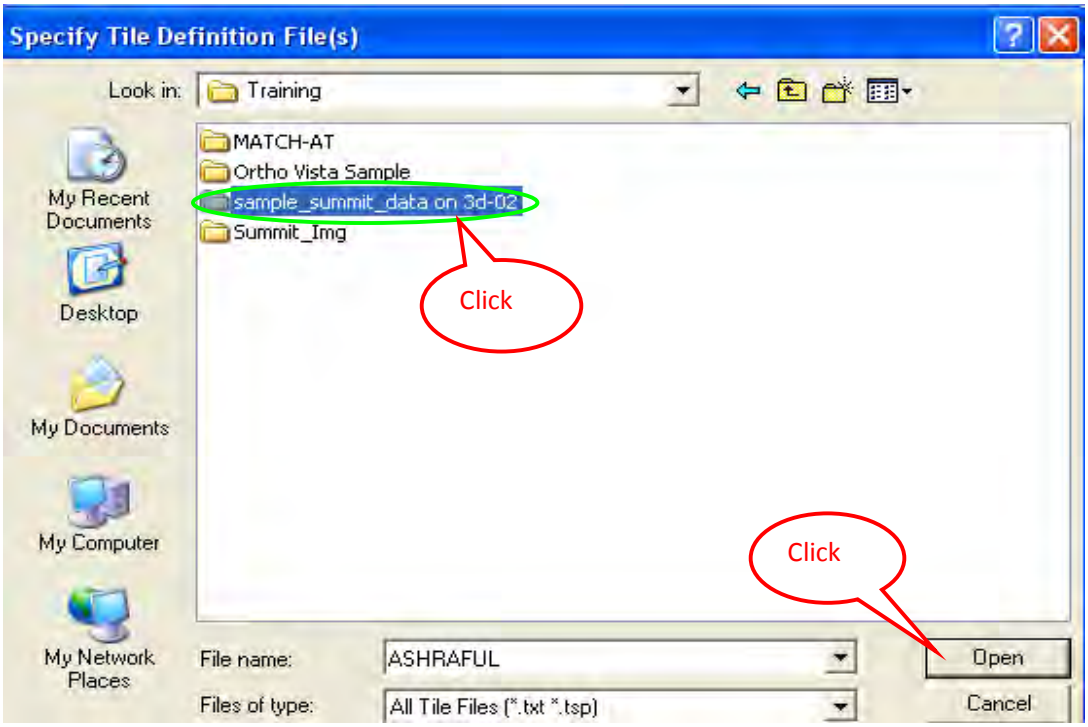
8. Write File Name:



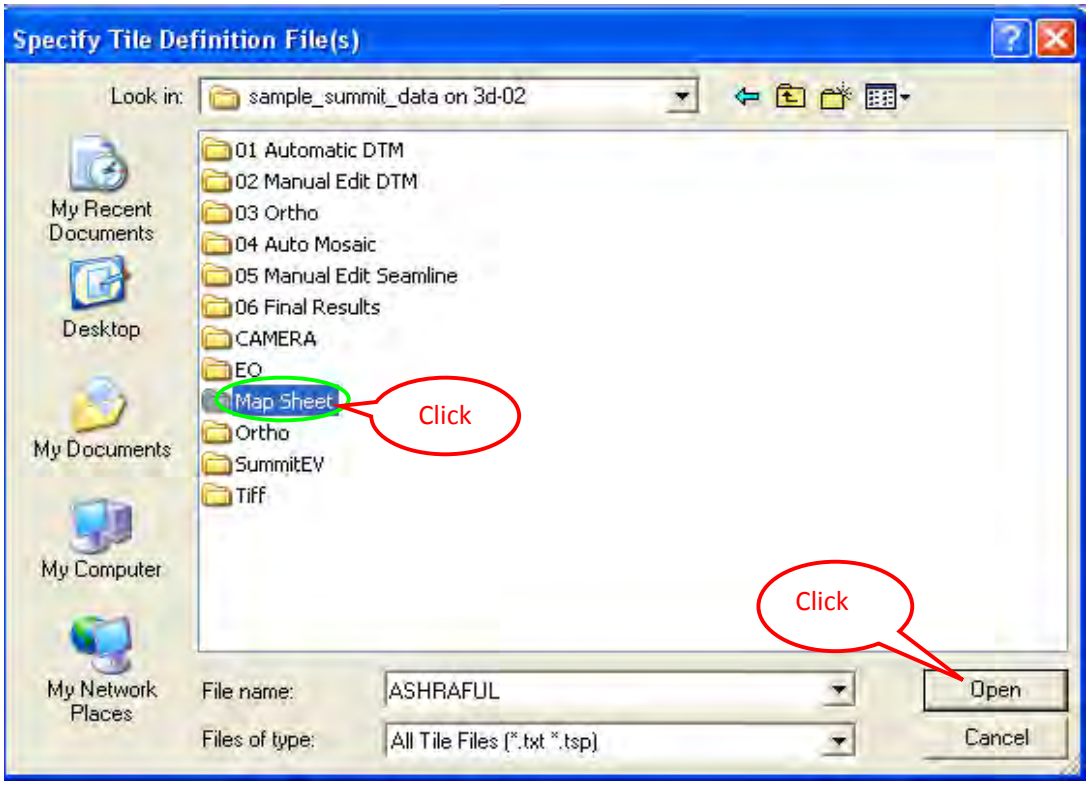
9. Select Training:



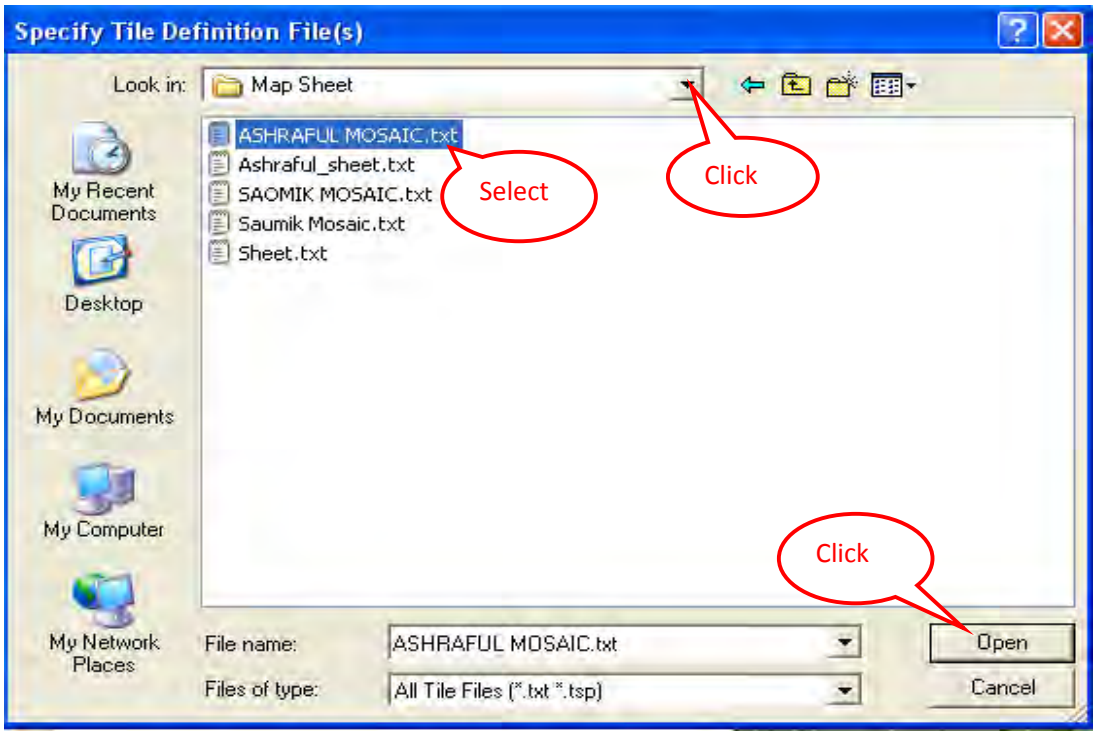
10. Select Sample summit data:



11. Select Map sheet:

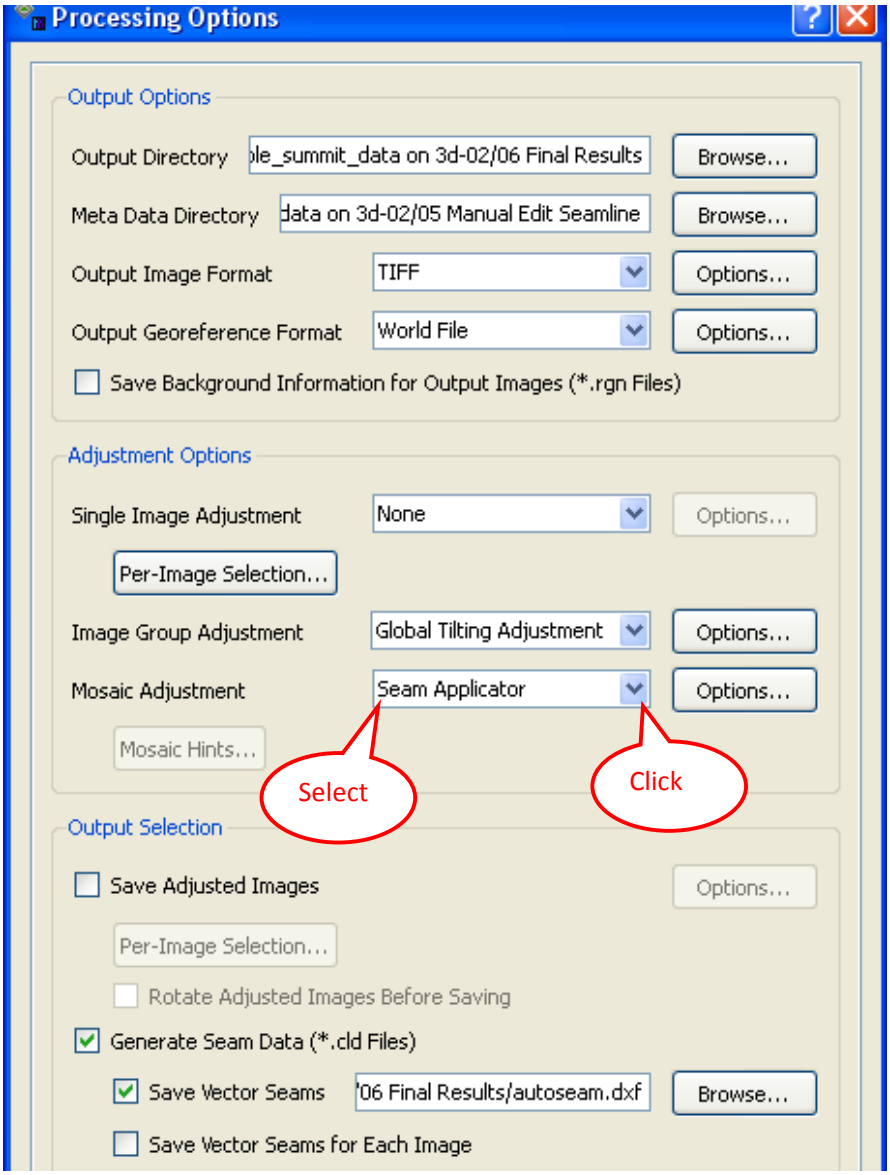


12. Select “Map Sheet”:

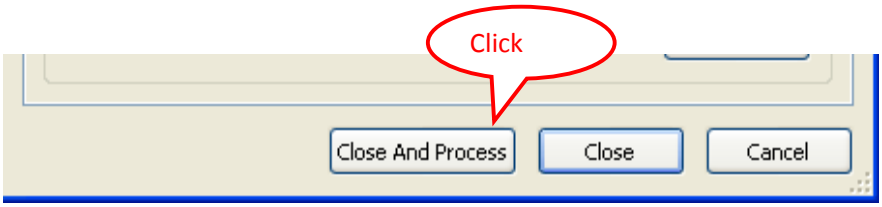


13. Select Area:

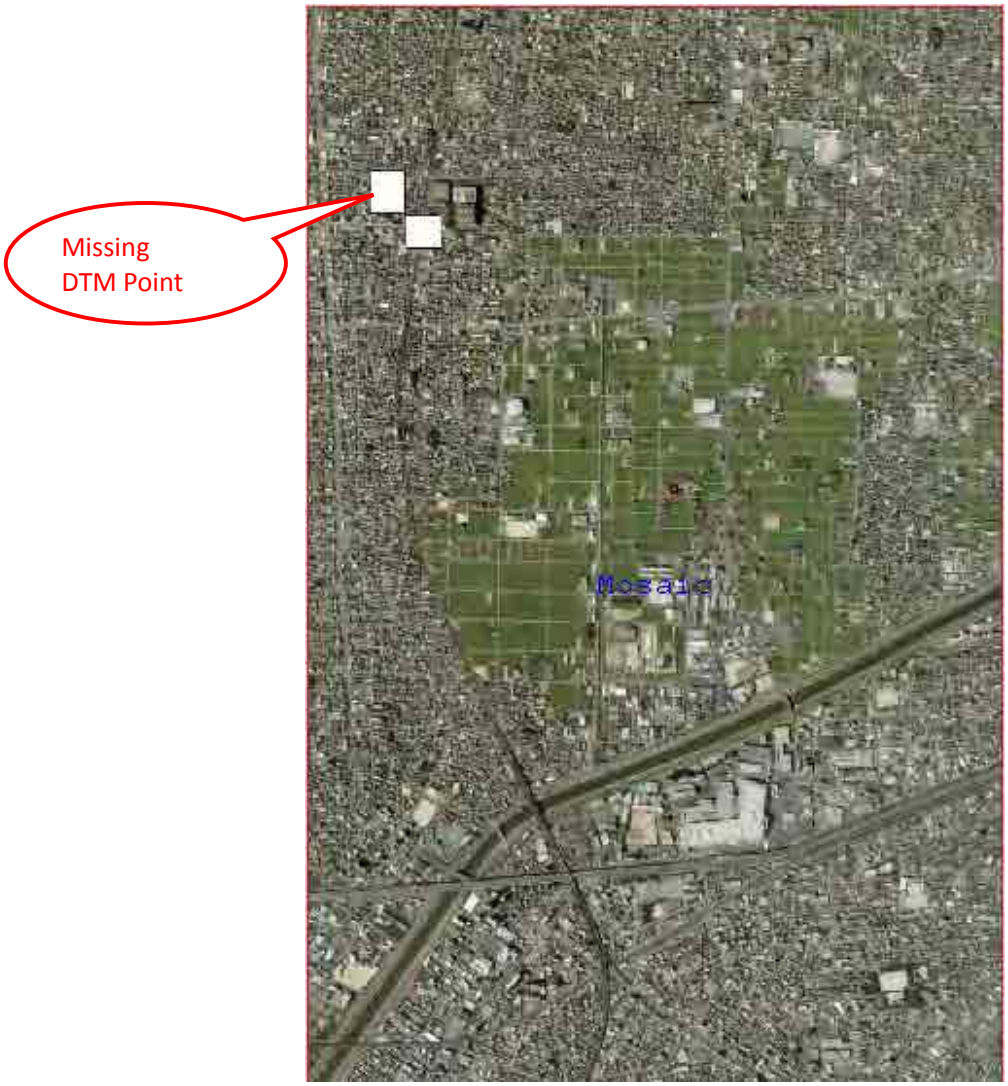
14. Start “Begin Process”:



15. Close and process:



16. Check Final Map by open the automatic seam to find modify area:



Bangladesh Digital Mapping Assistance Project

(BDMAP)

Work Manual of Digital Plotting

Ver.1.2

December 2011

Preface

In the field of Photogrammetry, two-dimensional coordinates is acquired from one piece of photo image only. But three dimensional coordinates (X, Y, Z) can be acquired from derived special model consists of stereo pairs of photo images photographed at two different positions with over-lap.

The Digital plotting is described as to acquire the “quantitative” and “qualitative” of an object on recorded image. “Quantitative,” means to acquire the position, length and the volume of object on the photo image. “Qualitative” means to acquire the structure of land cover information, for instance topographic and geological information such as a house, paddy field, dry field, pond, road, railway and embankment so on by using of photograph interpretation technology. “Digital Plotting” is work to record the “Qualitative” of the object existing on the photo images digitally with the help of Photo interpretation.

In the IDMS project, 1:25,000 scale digital plotting data are produced based on the result of Aerial Triangulation. Methodology of digital plotting is described on the “IDMS Operation Manual of Digital Plotting Ver1.0 (draft)” prepared by BDMAP team and actual digital plotting are carried out based on the manual with the help of Digital Plotting System. Acquired digital data will be categorized into certain groups based on “**MFC (Map Feature Code) number list (draft)”**

Preface

Contents

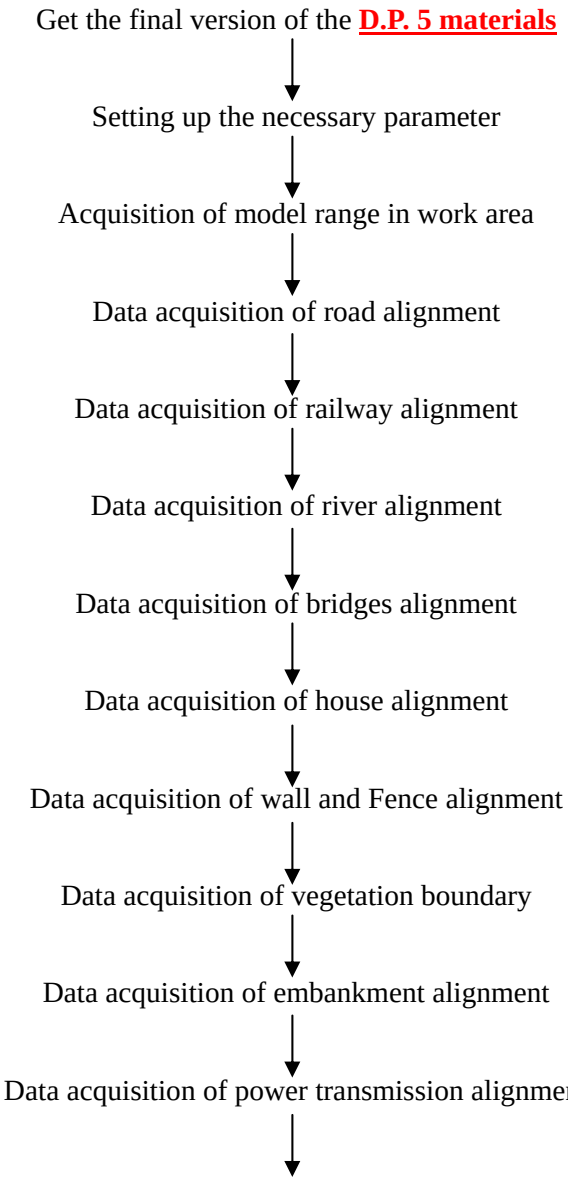
1. Workflow of digital plotting 1
1.1. Material to prepare for in digital plotting (**D.P. 5 materials**) 1
1.2. Standard workflow (digital plotting section) 1
2. Command to be used at digital plotting 3
3. MFC (Map Feature Code) number list 4
4. Symbol specification, 1:25,000 scale map 5
5. Data acquisition method 11
5.1. Road 1 11
5.2. Road 2 12
5.3. Railway 13
6.4. River/ Lake/Pond 14
5.5. Bridges 15
5.6. House 1 16
5.7. House 2 17
5.8. Wall and Fence 18
5.9. Vegetation 19
5.10. Embankment 20
5.11. Power transmission 21
5.12. Spot height 22
5.13. Contour 23
6. Logical check 24
6.1. Software to accomplish 24
6.2. Overshoot (Including Line Crossing Without Node Point) 25
6.3. Undershoot 30
6.4. Unclosed Polygon or Poly-line 34
6.5. Crossed Polygon 38
6.6. Double Object 42
6.7. Zero Length Object 46
6.8. Double Node Points 50
7. Visual check 58
7.1 Visual check on screen of digital plotting system 58
7.2 Visual check on the plotted out paper 58
7.3 Result table of the quality evaluation (RQE) 59

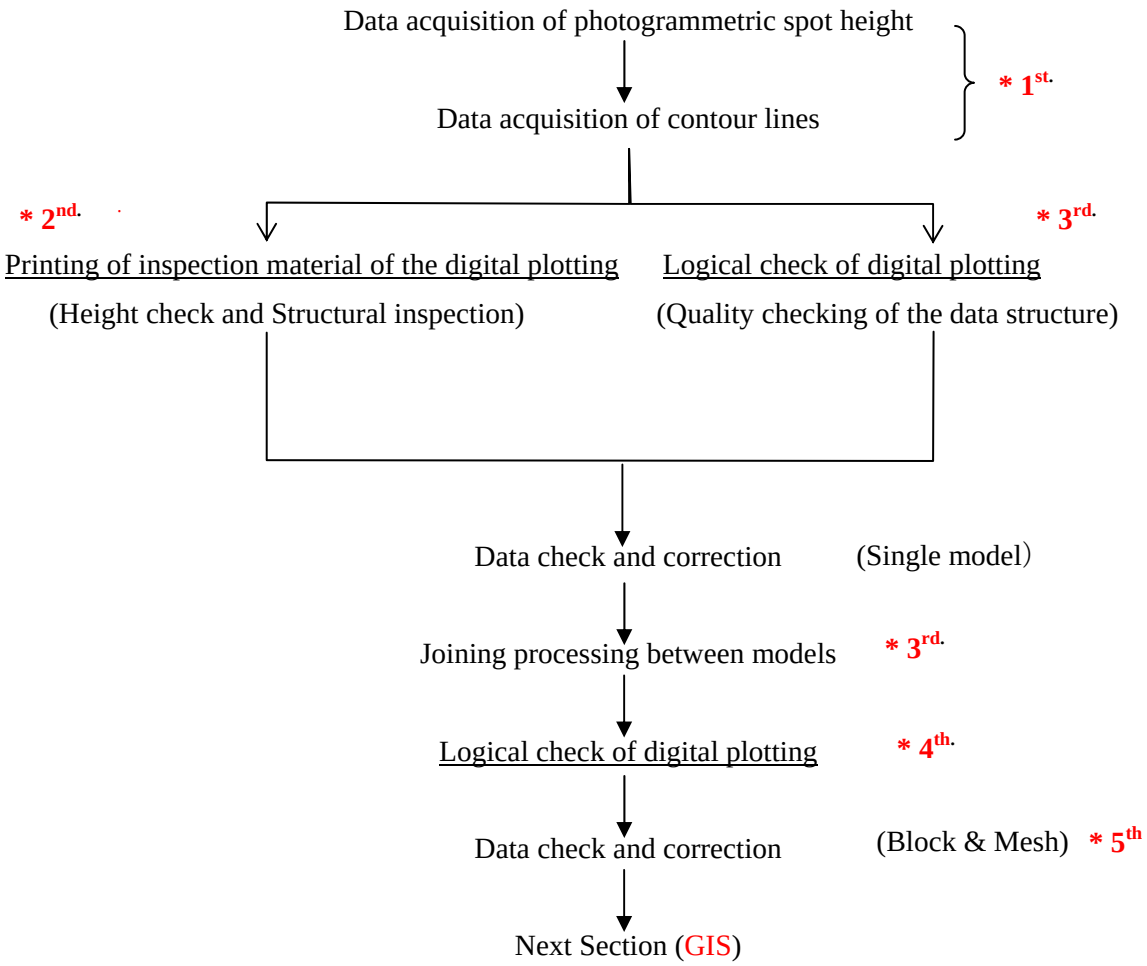
1. Workflow of digital plotting

1.1. Material to prepare for in digital plotting (**D.P. 5 materials**)

- Aerial photo data. (digital photo images)
- Eventual result of aerial triangulation
- Index map
- Aerial camera data. (Image size , Focal length)
- Map style and map symbols for 1:25.000 scale digital topographic map

1.2. Standard workflow (digital plotting section)





- Relief description

  The suggestions;.

  * 1st : First supervisor
  * 2nd : Second supervisor
  * 3rd : First supervisor
  * 4th : First supervisor
  * 5th : Supervisor

2. Command to be used at digital plotting

Ver. 2.3

Key command to be used on digital plotting

No.	Main-items	Sub-item	Key command to be used				Othe command
			Point	Polyline	Polygon	Text	Options
1	Road	Metal road		○			
		Unmetal road		○			
		Brick road		○			
		Cart track		○			
		Footpath		○			
2	Railway	Railway line		○			
3	River	Double line river			○		
		Single line river		○			
		Coastline		○			
4	Lake/Pond	Lake			○		
		Tank/Pond			○		
5	Bridges	Bridges		○			
		Culvert		○			
6	House	Normal house			○		
		Building (3m>)			○		1*
		Station house			○		Rectangle creation
		Airport house			○		
7	Fence	Wall		○			
		Fence		○			
8	Vegetation	Vegetation boundary		○			
		Area boundary		○			
		Vegetation symbol	○				
		UnVegetation symbol	○				
9	Embankment	Embankment (Over 3.0m)		●			
		Embankment (Below 3.0m)		●			
10	Power transmission	Line		○			
		Tower (Big)			○		
		Tower (Small)	○				
11	Spot height	Spot height	○			○	
12	Contour	Contour line(10m)		○			
		Index contour line (50m)		○			2*
		intermediate contour line (5m)		○			Spline Creation

○ : With out direction
● : With direction

1* Rectangle creation

2* Spline Creation

1*,2* Option :
Understand the nuts and bolts of the specifications of the command and appropriate choice

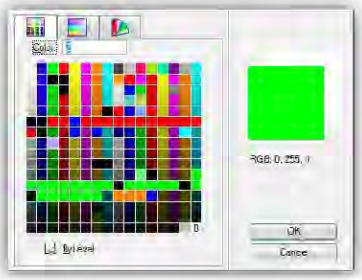
3. MFC (Map Feature Code) number list

Ver. 2.3

Map future table list is used for digital plotting (MFC)

No.	Main-items	Sub-item	MFC Code Table				Othe Code.
			Code.	Color	Line Style	Line Weight	Options
1	Road	Metal road	RD001	31	0	4	
		Unmetal road	RD002	32	3	4	
		Brick road	RD000	33	5	2	
		Cart track	RD07	34	2	3	
		Footpath	RD08	35	7	2	
2	Railway	Railway line	RL001	50	0	3	
3	River	Double line river	HF001	100	0	2	
		Single line river	HF002	101	0	1	
		Coastline	HF000	102	0	2	
4	Lake/Pond	Lake	HF09	113	0	1	
		Tank/Pond	HF10	114	0	1	
5	Bridges	Bridges	RD001	44	0	2	
		Culvert	RD16	45	0	1	
6	House	Normal house	BL601	91	0	1	
		Building (3m >)	BL602	92	0	3	
		Station house	BL603	93	0	2	
		Airport house	BL604	94	0	2	
7	Fence	Wall	BL46	95	0	2	
		Fence	BL47	96	3	1	
8	Vegetation	Vegetation boundary	LV001	130	0	3	
		Area boundary	LV000	131	2	3	
		Vegetation symbol	LV002	135	0	0	
		UnVegetation symbol	LV003	136,137	0	0	
9	Embankment	Embankment (Over 3.0m)	HF20	41	0	2	
		Embankment (Below 3.0m)	HF21	42	0	1	
10	Power transmission	Line	PT01	65	0	1	
		Tower (Big)	PT02	66	0	1	
		Tower (Small)	PT03	67	0	1	
11	Spot height	Spot height	RF04	143	0	1	
12	Contour	Contour line(10m)	RF02	131	0	1	
		Index contour line (50m)	RF01	130	0	3	
		intermediate contour line (5m)	RF03	132	3	1	

Color No. :10 to 254



Line style :0 to 15

Line weight :0 to 15

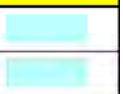
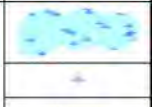
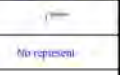
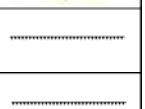
4. Symbol specification, 1:25,000 scale map

Ver. 2.1	DIGITAL PLOTTING FEATURES								PLOTTING	CARTOGRAPHIC DATABASE
			GEOMETRY							
	Main Category	Sub Category	Point	Polyline	Polygon	Text	Feature Code	Preference information	SYMBOL	Symbol ##% scaled
1-1	Administrative Boundary									
1-2										
1-3										
1-4										
1-5										
1-6										
1-7										
1-8										
1-9										
2-1	Control Points									
2-2										
2-3										
3-1	Transportation and related structure	Metal Road		●			RD001			
3-0	Transportation and related structure	Belck Road		●			RD000			
3-4	Transportation and related structure	Unmetal Road		●			RD002			
3-7	Transportation and related structure	Cart Track		●			RD07			
3-8	Transportation and related structure	Footpath		●			RD08			

Ver. 2.1	DIGITAL PLOTTING FEATURES									CARTOGRAPHIC DATABASE
			GEOMETRY						PLOTTING	
	Main Category	Sub Category	Point	Polyline	Polygon	Text	Feature Code	Preference information	SYMBOL	Symbol ##% scaled
3-10	Transportation and related structure	Bridges		●			RD001			
3-16	Transportation and related structure	Culvert		●			RD16			
4-1	Transportation and related structure	Reilway Line		●			RL001			
										No represent on map
										No represent on map
										No represent on map

Ver. 2.1	DIGITAL PLOTTING FEATURES									CARTOGRAPHIC DATABASE
			GEOMETRY						PLOTTING	
	Main Category	Sub Category	Point	Polyline	Polygon	Text	Feature Code	Preference information	SYMBOL	Symbol ??% scaled
3-19	Transportation and related structure	Foot overpass								
6-42	Transportation and related structure	Bus Terminal Symbol			■		BL601	■		
6-23	Transportation and related structure	Airport symbol			●		BL601	■		
6-26	Transportation and related structure	Air strip			●		LV000		Acquire data as Area boundary	
6-27	Transportation and related structure	Helipad symbol	●				PT27		Ⓗ	
6-41	Transportation and related structure	Ferry Terminal symbol			●		BL601			
6-2	Facilities	Symbol for Fire Service			●		BL601			
6-12	Facilities	Symbol for School/Madrasha			■		BL601	■		
6-16	Facilities	Symbol for Mosque			●		BL111	■		

Ver. 2.1	DIGITAL PLOTTING FEATURES								PLOTTING	CARTOGRAPHIC DATABASE
			GEOMETRY							
	Main Category	Sub Category	Point	Polyline	Polygon	Text	Feature Code	Preference information	SYMBOL	
6-18	Facilities	Symbol for Temple			●		BL111	■		
									Acquire data as Area boundary	
6-45	Buildings and Structures	Building/House			●		BL601			No represent
6-46	Buildings and Structures	Peripheral wall		●			BL46			
6-47	Buildings and Structures	Peripheral fence		●			BL47			
5-1	Buildings and Structures	Power Transmission Line		●			PT01			
5-2	Buildings and Structures	Power Transmission Tower			●		PT02			
5-3	Buildings and Structures	Power Transmission Ploe	●				PT03			
6-44	Buildings and Structures	Brick Field	●				PT05	■		
7-0	Hydrographic Features	Coastline		●			HF000			

Ver. 2.1	DIGITAL PLOTTING FEATURES									CARTOGRAPHIC DATABASE
			GEOMETRY						PLOTTING	
	Main Category	Sub Category	Point	Polyline	Polygon	Text	Feature Code	Preference information	SYMBOL	Symbol ##% scaled
7-2	Hydrographic Features	Double line river			●		HF000			
7-4	Hydrographic Features	Single line river		●			HF002			
										
7-9	Hydrographic Features	Lake			●		HF09			 No represent
7-10	Hydrographic Features	Tank/Pond			●		HF10			 No represent
7-11	Hydrographic Features	Bill/Hawar			●		HF11			
7-15	Hydrographic Features	Sand		●			LV001	■	SD	
7-16	Hydrographic Features	Submerged Sand		●			LV001	■	SA	
7-17	Hydrographic Features	Mud		●			LV001	■	MD	
7-18	Hydrographic Features	Swamp		●			LV001	■		 No represent
7-22	Embankment	Sluice		●			HF22			 No represent
7-20	Embankment	Embankment over 3m		●			HF20			
7-21	Embankment	Embankment below 3m		●			HF21		Acquire data as Embankment	No represent

Ver. 2.1	DIGITAL PLOTTING FEATURES									CARTOGRAPHIC DATABASE
			GEOMETRY						PLOTTING	
	Main Category	Sub Category	Point	Polyline	Polygon	Text	Feature Code	Preference information	SYMBOL	Symbol 60% scaled
									Acquire data as Embankment	
8-0		Area boundary		●			LV000	■		
8-1	Cultivation & Vegetation	Vegetation boundary		●			LV001			
8-2	Cultivation & Vegetation	Cultivated Area	●				LV002	■		
8-3	Cultivation & Vegetation	Uncultivated Area	●				LV003	■		
8-6	Cultivation & Vegetation	Tea Garden Area					LV001	■		
8-7	Cultivation & Vegetation	Betel Garden Area					LV001	■		
8-8	Cultivation & Vegetation	Orcherd Garden Area					LV001	■		
9-2	Forest	Mangrove Area			●		LV001	■		
9-3	Forest	Dense Mixed Area			●		LV001	■		
9-4	Forest	Mainly Bamboo Area			●		LV001	■		
9-5	Forest	Scrubs/Bush Area			●		LV001	■		
10-1	Relief	index Contour Lines		●			RF01			
10-2	Relief	Intermediate Contour Lines		●			RF02			
10-3	Relief	Supplementary Contour Lines		●			RF03			
10-4	Relief	Spot Height	●			●	RF04		● 12.2	

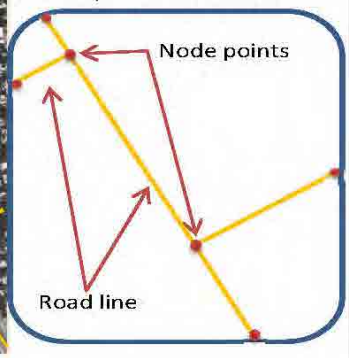
5. Data acquisition method

5.1. Road 1

No.	Main category	Sub category	Type	Notation	Ver1.0
1	Road	Metal	Polyline	RD001	
2	Road	Unmetal	Polyline	RD002	

Sample of stereo image

■Sample of road data



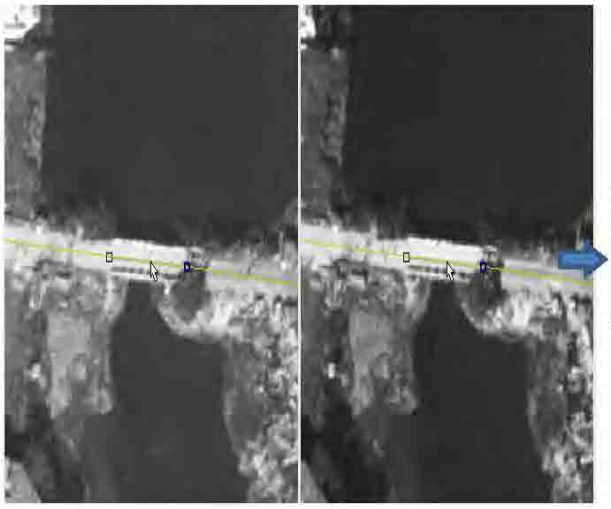
– Data Acquisition method
The road center line will be obtained as road data by single line.

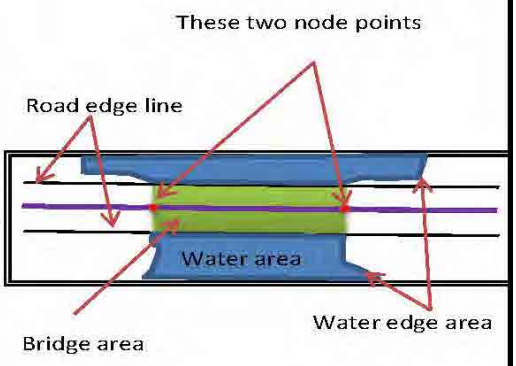
– Minimum data acquisition
The road length less than 100m is not necessary to be obtained due to the short length of road on 1:25,000 scale map.

– Important point for data acquisition
Node points have to be obtained at the crossing points of the roads shown above.

– At the bridge
The road data have to be obtained as follows:

■Sample of stereo image of road with bridges



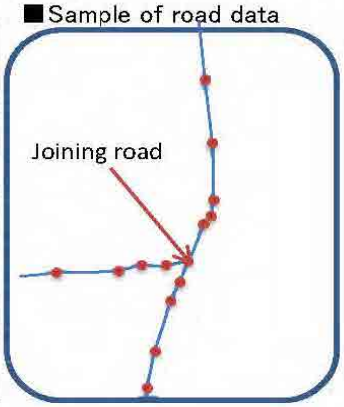


5.2. Road 2

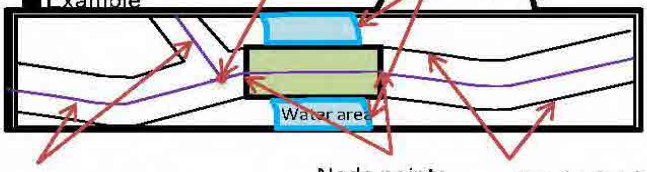
No.	Main category	Sub category	Type	Notation	Ver1.0
3	Road	Brick	Polyline	RD000	
4	Road	Cart track	Polyline	RD07	
5	Road	Footpath	Polyline	RD08	

Sample of stereo image

■Sample of road data



■Example



Road data by single line

Node points

Road edge line

- Data Acquisition method

The road end/start point must be connected with the node points of others road.
Data will be acquired by the photo interpretation.
The centre of Brick/Cart track road shall be plotted.
All the Brick/Cart track Road shall be plotted.

- Minimum data acquisition

The road length less than 100m is not necessary to be obtained due to the short length of road on 1:25,000 scale map.

- Important point for the data acquisition

Node points have to be obtained at the both edges of the bridge connecting points of the roads.

- At the location of bridge

The road data have to be obtained as follows:

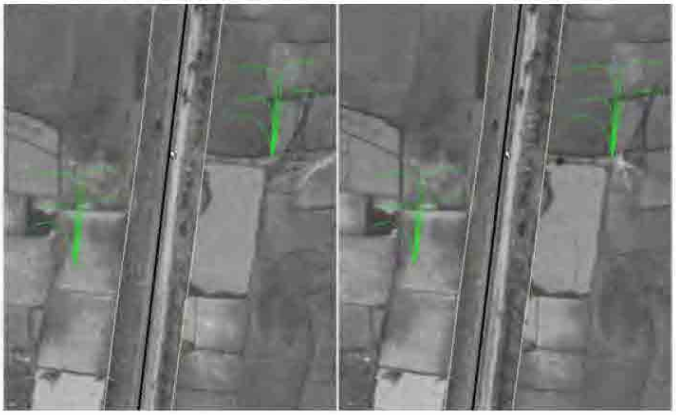
Definition

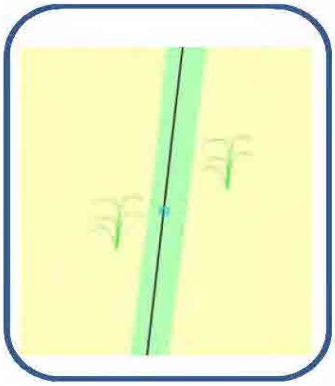
Category	Road of materials	Width of the road
Brick:	Brick	More than 2.0m
Cart track:	Unmetal	2.0m ~0.5m
Footpath:	Unmetal	Less than 0.5m

5.3. Railway

No.	Main category	Sub category	Type	Notation	
6	Railway	Railway line	Polyline	RL001	Ver1.0

Sample of stereo image



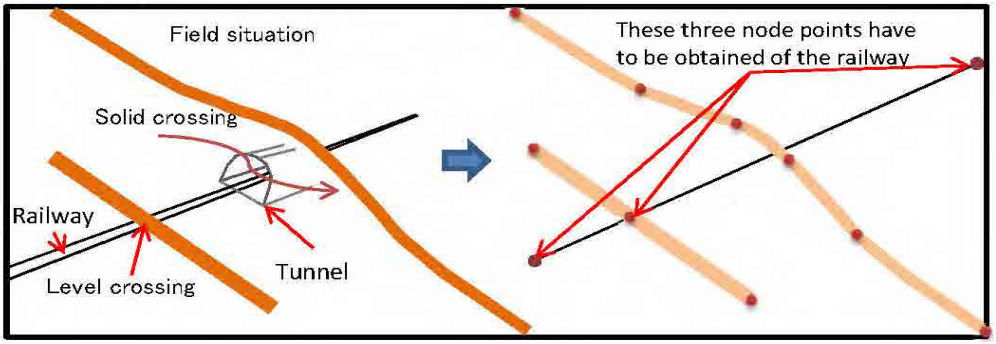


: Railway

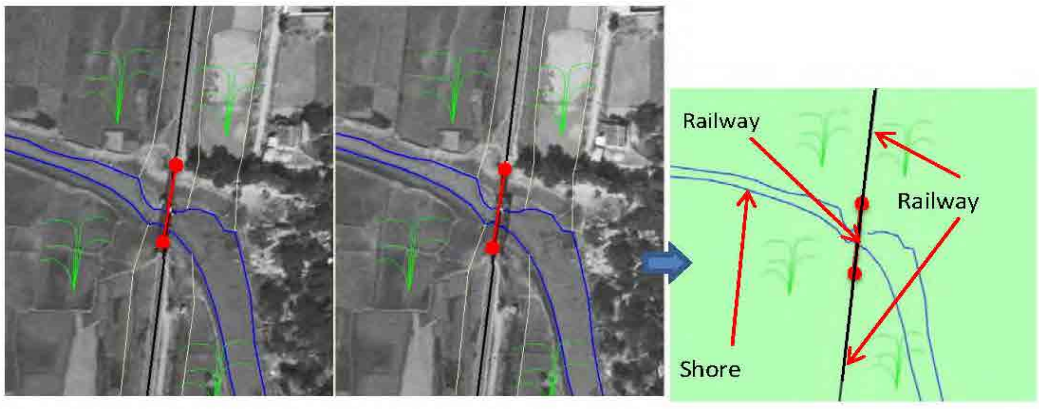
– Data Acquisition method

The railway center line will be obtained as railway data by single line.

– Railway network



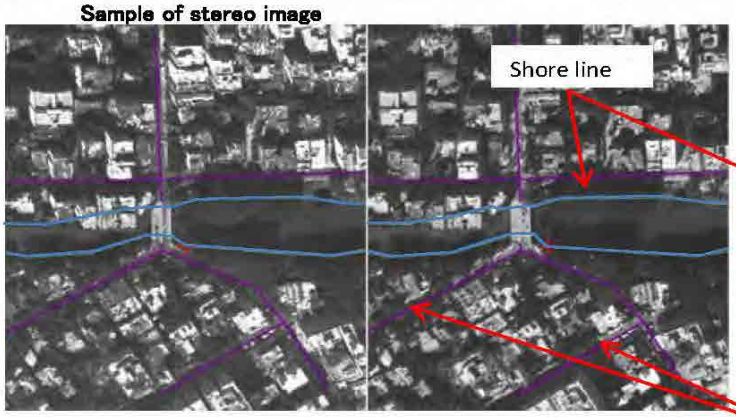
■Sample of railway bridge data



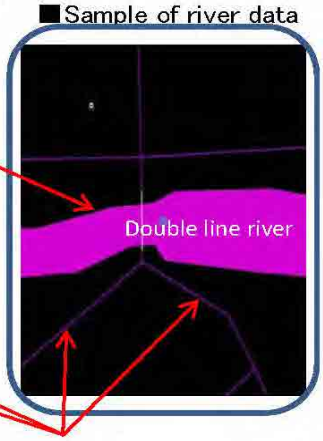
6.4. River/ Lake/Pond

No.	Main category	Sub category	Type	Notation	Ver1.0
7	River	Double line	Polygon	HF001	
8	River	Single line	Polyline	HF002	
9	River	Lake	Polygon	HF09	
10	River	Tank/Pond	Polygon	HF10	

Sample of stereo image



■Sample of river data



- Data Acquisition method

The shore line will be obtained as river data by polyline.

- Minimum data acquisition

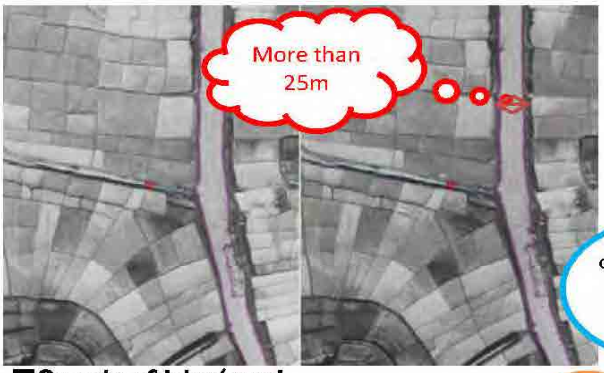
The river length less than 250m is not necessary to be obtained due to the short length of river on 1:25,000 scale map.

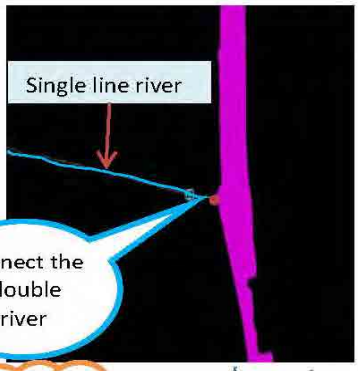
- Important point for the data acquisition

Once points have to be obtained at the crossing points of the shore line expressed

The lake and tank/pond diameter less than 25m is not necessary.

■Sample of Double/Single river





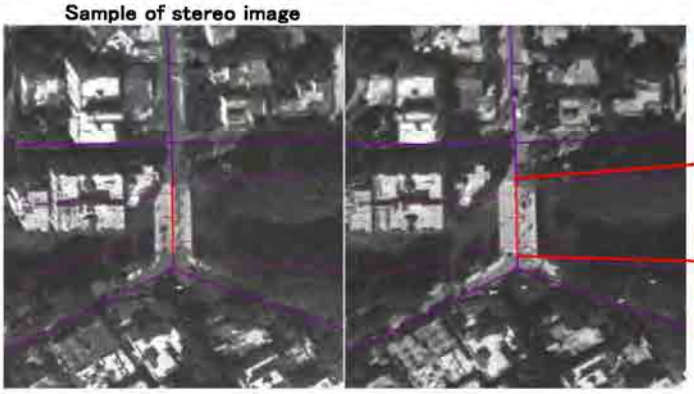
■Sample of lake/pond

Data acquisition of pond is bigger than 25m

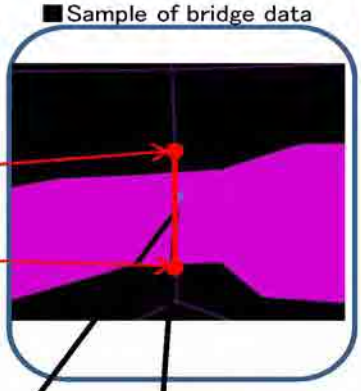
5.5. Bridges

No.	Main category	Sub category	Type	Notation	Ver1.0
11	Bridges	Bridges	Polyline	RD001	
12	Bridges	Culvert	Polyline	RD16	

Sample of stereo image



■Sample of bridge data

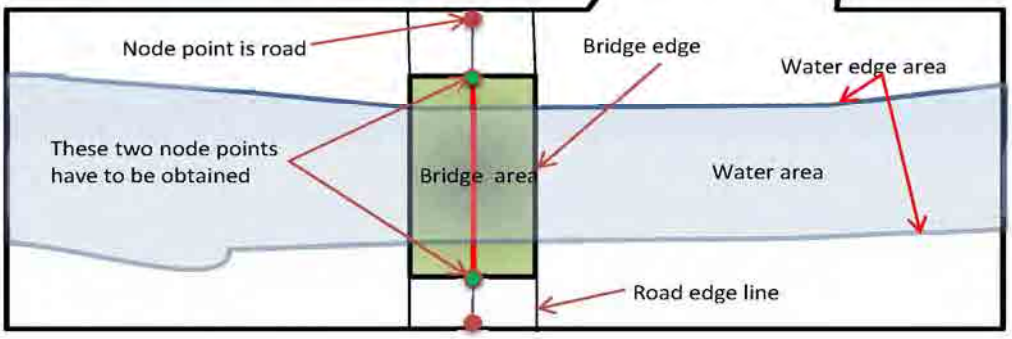


- Data Acquisition method

The bridge center line will be obtained as bridge data by line.

- Minimum data acquisition

The river length less than 5m is not necessary to be obtained due to the short length of river on 1:25,000 scale map.



● : Node points of road and bridges

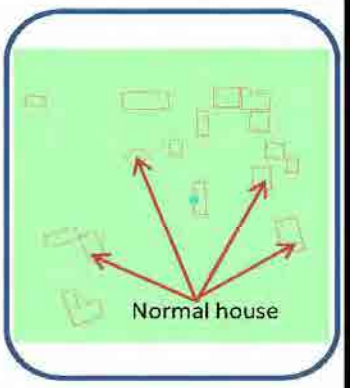
■**Sample of Culvert data**

5.6. House 1

No.	Main category	Sub category	Type	Notation	Ver1.0
13	House	Normal house	Polygon	BL601	
14	House	Building (3m >)	Polylgon	BL602	

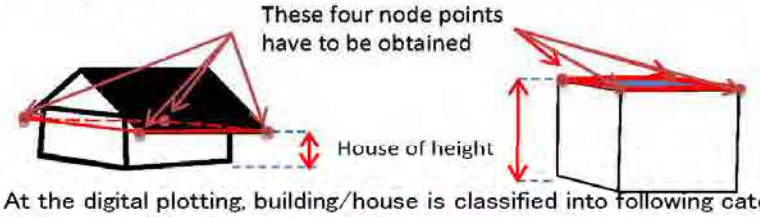
Sample of stereo image

■Sample of normal house dat



– Data Acquisition method

1. The normal house line will be obtained as house data by polygon line.
2. The height of the house and the building definitions are as follows.



3. At the digital plotting, building/house is classified into following categories:
   > Height of building/house is less than 3m –> Normal house
   > Height of building/house is more than 3m –> Building

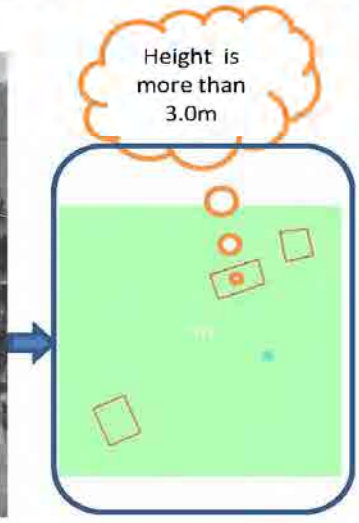
– Minimum data acquisition

The house length less than 5m is not necessary to be obtained due to the external form of the house on 1:25,000 scale map.

– Important point for the data acquisition

Node points have to be obtained at the point not cross line of the external form of the house.

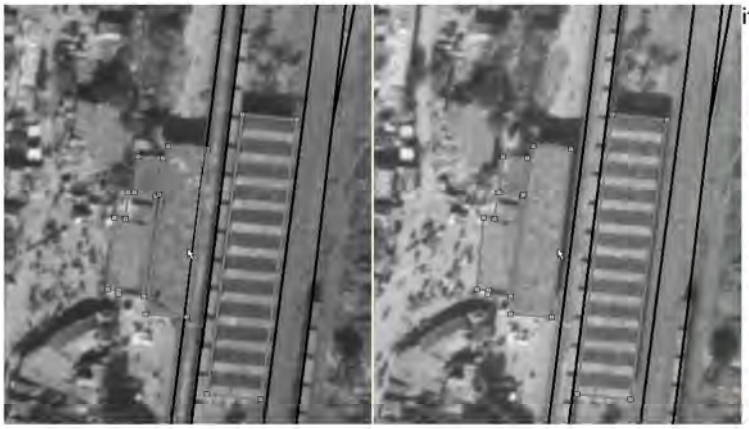
■Sample of stereo image of Buildings



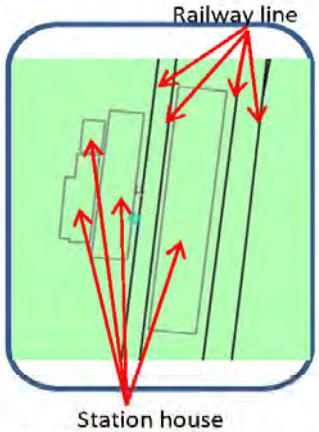
5.7. House 2

No.	Main category	Sub category	Type	Notation	Ver1.0
15	House	Station house	Polygon	BL603	
16	House	Airport house	Polygon	BL604	

Sample of stereo image



■Sample of station house
ith

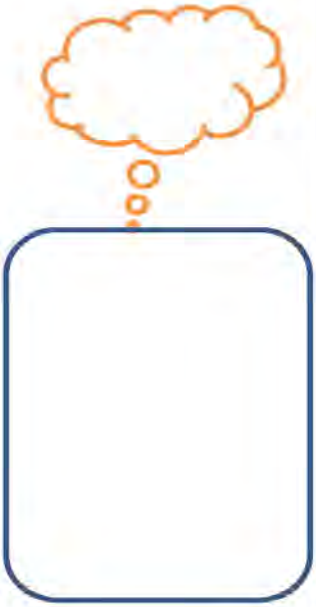


– Data Acquisition method
The normal house line will be obtained as house data by polygon line.

– Minimum data acquisition
The station house and airport house length less than 5m is not necessary to be obtained due to the external form of the house on 1:25,000 scale map.

– Important point for the data acquisition
Node points have to be obtained at the not cross line of the external form of the

*Example Airport house

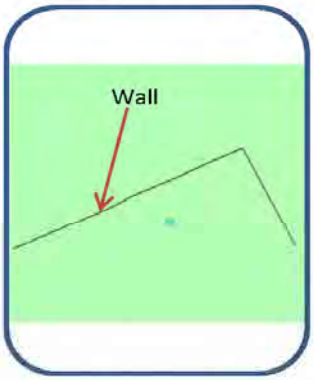


5.8. Wall and Fence

No.	Main category	Sub category	Type	Notation	Ver1.0
17	Fence	Wall	Polyline	BL46	
18	Fence	Fence	Polyline	BL47	

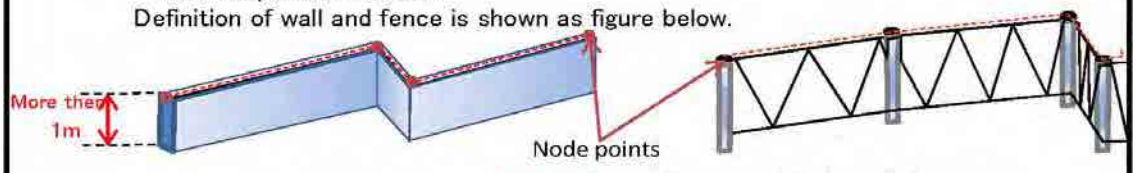
Sample of stereo image

■Sample of wall data



– Data Acquisition method

Definition of wall and fence is shown as figure below.



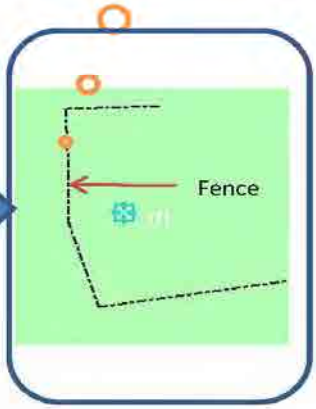
: Position to acquire by digital plotting

– Classification of wall and fence

* Materials : **Wall** –>Bricks, Concrete. **Fence**–>Wire
* Height/Length :More than 1m in the height and 100m length.

Height is more than 1.0m

■**Sample of fence data**

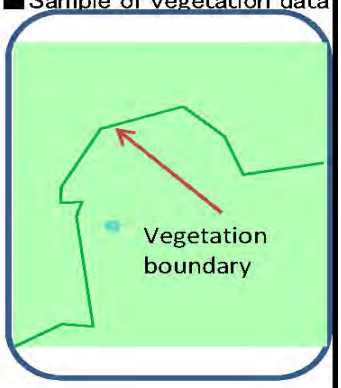


5.9. Vegetation

No.	Main category	Sub category	Type	Notation	Ver1.0
19	Vegetation	Vegetation boundary	Polyline	LV001	
20	Vegetation	Area Boundary	Polyline	LV000	
21	Vegetation	Vegetation symbol	Point	LV002	
22	Vegetation	Unvegetation symbol	Point	LV003	

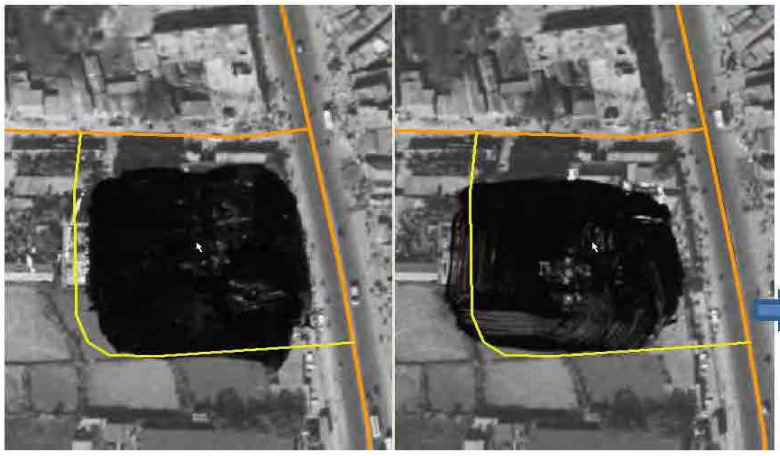
Sample of stereo image

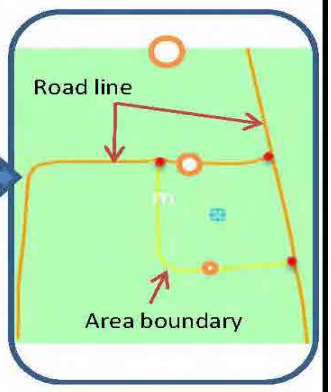
■Sample of vegetation data



– Data Acquisition method
Actual or imaginary line have to be obtained when the one area of vegetation is separated from other vegetation area.
The data will be acquired by the photo interpretation. The boundary of vegetation shall be plotted.
– Minimum data acquisition
The vegetation area less than 100m x 100m is not necessary to be obtained due to the small of vegetation area on 1:25,000 scale map.
– Important point for the data acquisition
Vegetation symbol have to be applied at the one area points of the one vegetation

The symbol is put in the center of the area. –> No.21,22



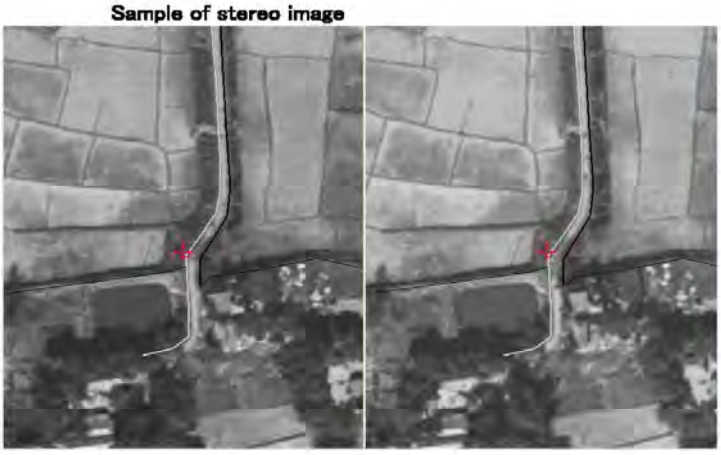


The centre of boundary of special territory/zone shall be plotted.
A actual or imaginary line that marks at special area, EX. Mine, shall be identified.

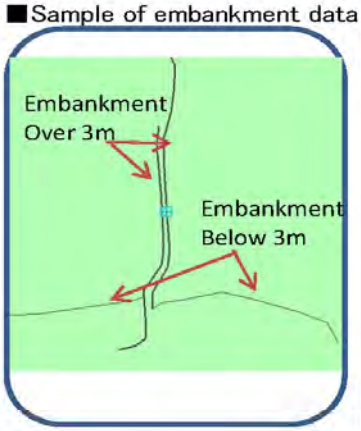
5.10. Embankment

No.	Main category	Sub category	Type	Notation	Ver1.0
23	Embankment	Embankment over 3m	Polyline	HF20	
24	Embankment	Embankment below 3m	Polyline	HF21	

Sample of stereo image



■Sample of embankment data



- Data Acquisition method

The embankment will be obtained as line data at highest position of embankment. The edge of top of embankment shall be plotted. The direction of plotting is shown as below. The lower side is always right side while plotting.

- Minimum data acquisition

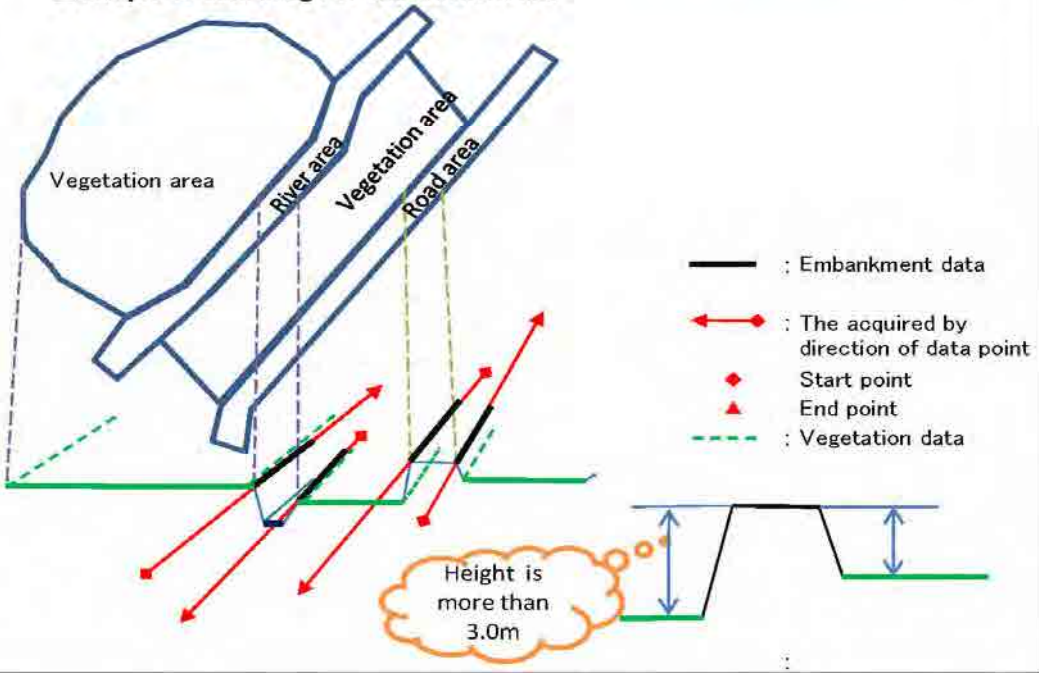
The length less than 100m is not necessary to be obtained due to the short length of embankment on 1:25,000 scale map.

- Important point for the data acquisition

In the case of the width between an upper and lower of less than 1.0m, lower is not to be obtained.

Embankment with a height of 1.0m or more and a length of 100m or more is to be obtained.

■Sample of data image of embankment line

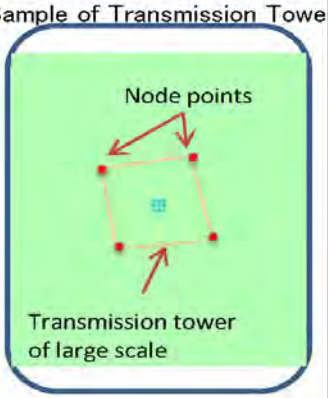


5.11. Power transmission

No.	Main category	Sub category	Type	Notation	Ver1.0
25	Power Transmission	Line	Polyline	PT01	
26	Power Transmission	Tower (Large)	Polygon	PT02	
27	Power Transmission	Tower (Small)	Point	PT03	

Sample of stereo image

■Sample of Transmission Towe



:

- Data Acquisition method

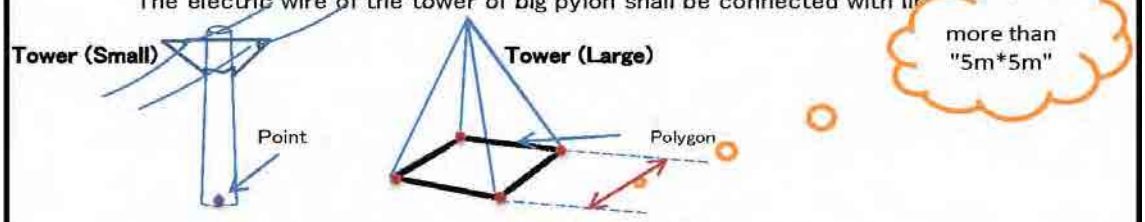
The transmission tower line will be obtained as tower data by polygon line.
The transmission pillar will be obtained as tower data by symbol "NS903".

- Minimum data acquisition

The large scaled tower more than "5m*5m" should be obtained.

- Important point for the data acquisition

The electric wire of the tower of big pylon shall be connected with lin



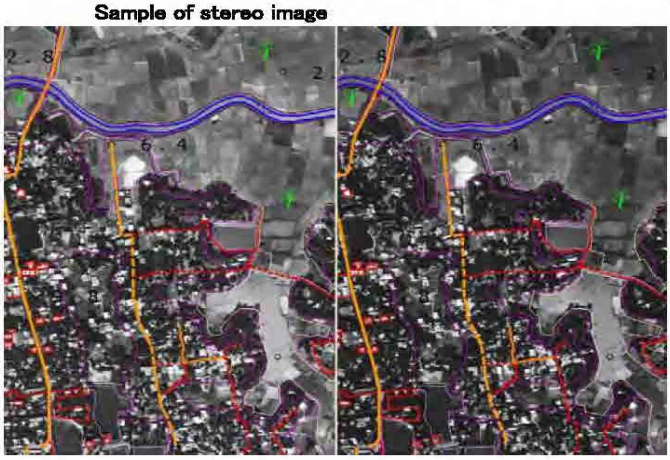
■Sample of stereo image of power transmission line

:

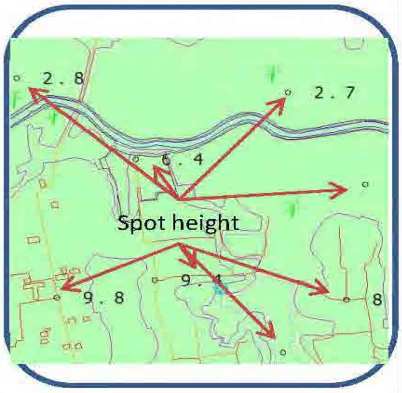
5.12. Spot height

No.	Main category	Sub category	Type	Notation	
28	Spot height	Spot height	Point	RF04	Ver1.0

Sample of stereo image



■Sample of spot height



- Data Acquisition method
1. The spot symbol will be obtained at the road cross over point
2. The spot symbol will be obtained at the road line
3. The spot height symbol will be obtained at the top of mountain or hollow.
4. Acquire the height of other positions as a ground level or specific area.

- Minimum data acquisition
The spot symbol will be obtained approximately 1.0cm～1.5cm spacing from the spot height symbol on 1:25,000 scale map.

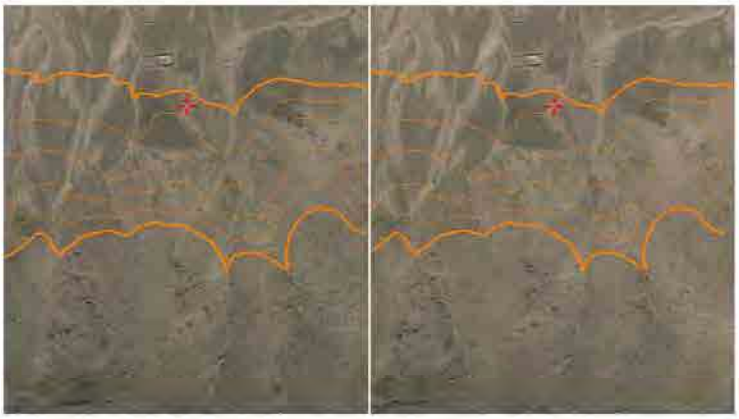
- Important point for the data acquisition
The elevation value shall be displayed by one digit after decimal point in me

*Example

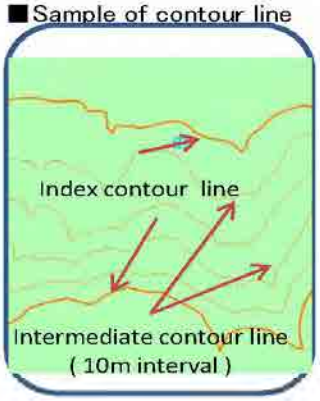
5.13. Contour

No.	Main category	Sub category	Type	Notation	Ver1.0
29	Contour Line	Intermediate contour line (10m)	Polyline	RF02	
30	Contour Line	Index contour line (50m)	Polyline	RF01	
31	Contour Line	Supplementary contour line (5m)	Polyline	RF03	

Sample of stereo image



■Sample of contour line



– Data Acquisition method

Index contour line indicates height of 0m and every fifth intermediate contour line counting from the line at 0m. Index contour line is shown at every 50m intervals.

Intermediate contour line indicates 10m intervals starting from the mean sea level.

Supplementary contour line is used at a place at the flat area or complicated relief feature such as cannot be appropriately depicted only by intermediate contour line.

– Minimum data acquisition

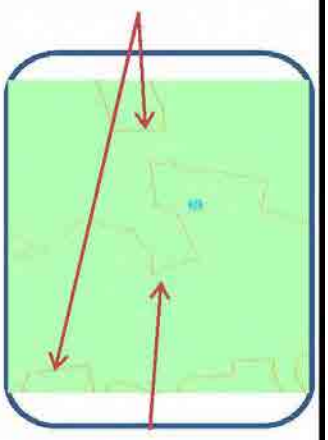
The contour line length less than 250m is not necessary to be obtained due to the contour on 1:25,000 scale map.

– Important point for the data acquisition

For the data acquisition, line data is not necessary to make an orientation.

■Sample of stereo image of supplementary contour line

Intermediate contour line



6. Logical check

Type of Errors which can be detected by Logical Check by using of Map 3D/AutoCAD;

Note:

1) **Logical check is not almighty.**
2) **Error data will not be detected depending on the value of tolerance.**
3) **Automatic correction is not recommended.**

6.1. Software to accomplish

Following types of errors can be detected by logical check by using AutoCAD Map 3D.

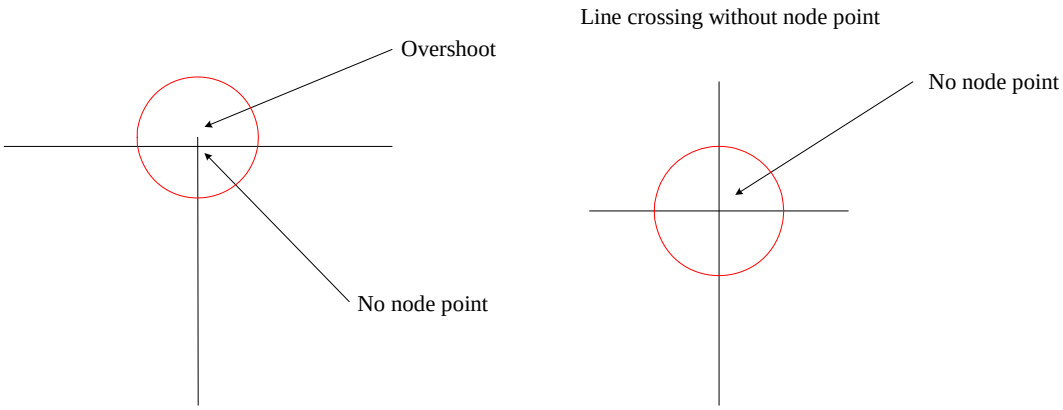
1. Overshoot (including line crossing without node point)
2. Undershoot
3. Unclosed polygon or poly-line
4. Closed polygon
5. Double object
6. Zero length object
7. Double node point
8. Unconnected poly-line

Relation between data type and logical checks is as follow:

Name of data	Data type	Item of logical check
All data	Polygon Poly-line	- Double object - Zero length object - Double node point
House Building Pond Lake Double line river	Polygon	- Unclosed polygon - Crossed polygon
Road Single line river Railway Vegetation boundary	Poly-line	- Overshoot (including line crossing without node point) - Undershoot - Unconnected poly-line
Transmission line	Poly-line	- Overshoot - Undershoot - Unconnected poly-line
Contour line	Poly-line	- Overshoot - Undershoot - Unconnected poly-line

6.2. Overshoot (Including Line Crossing Without Node Point)

1) Sample of error



2) How to detect the error

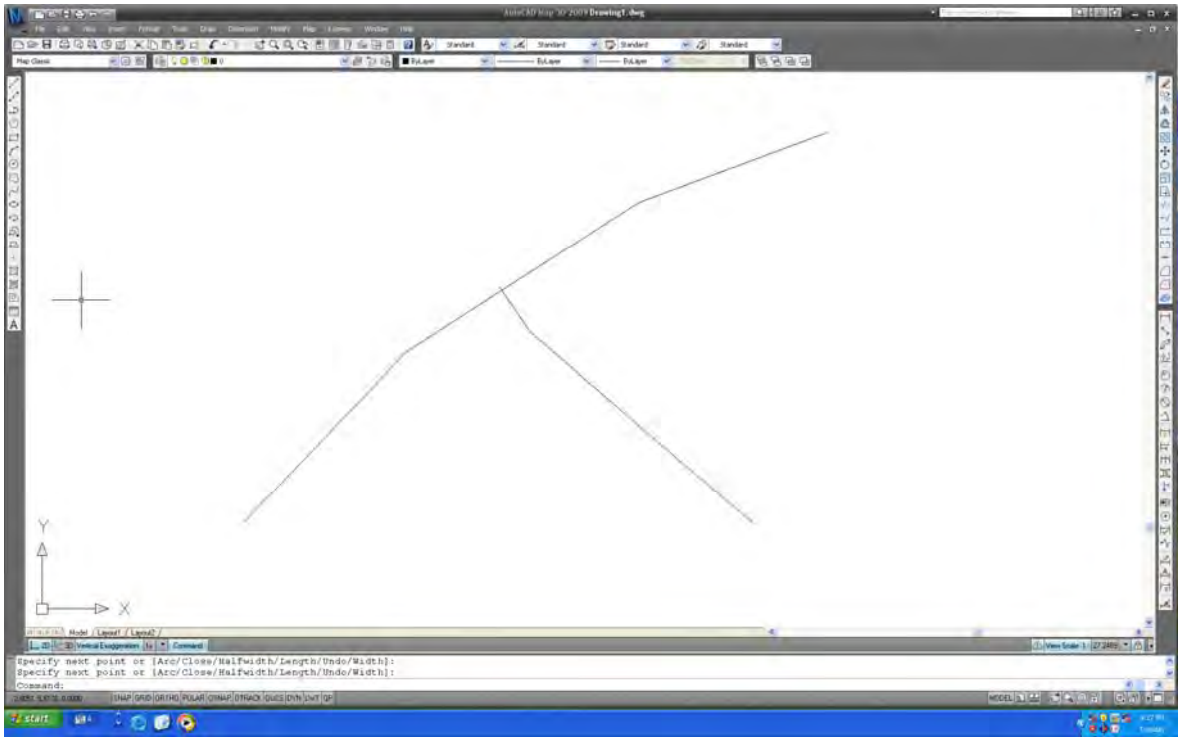
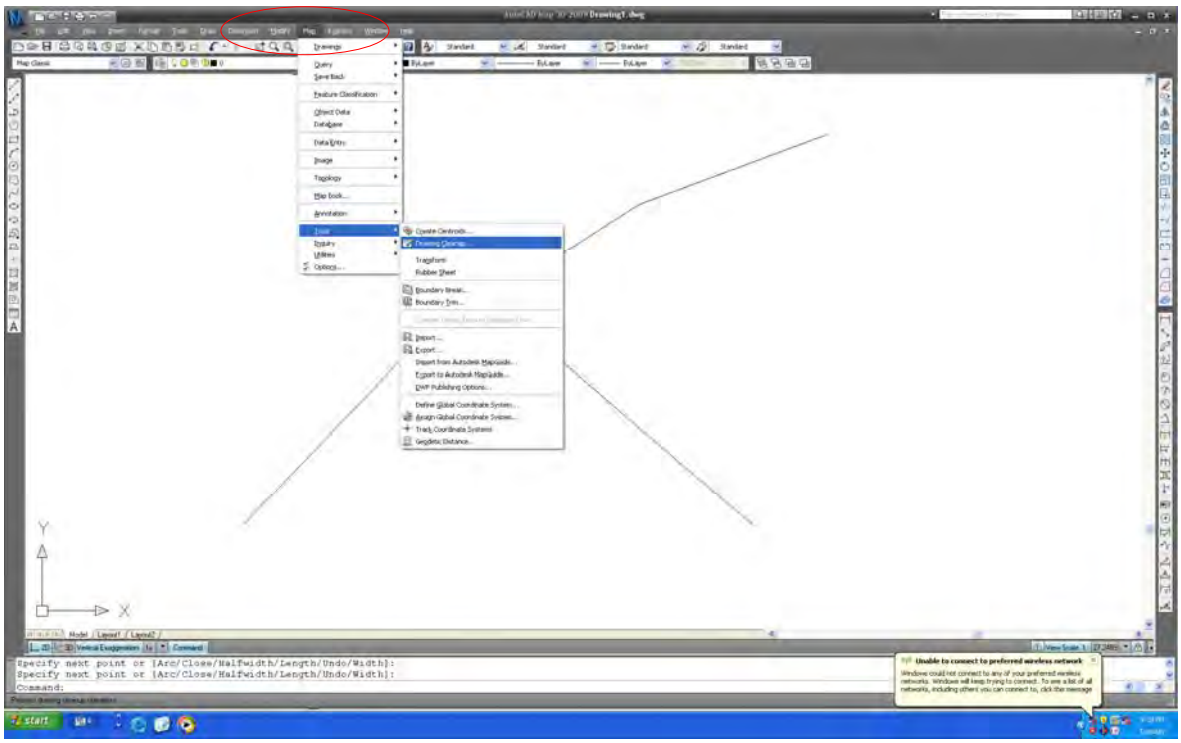
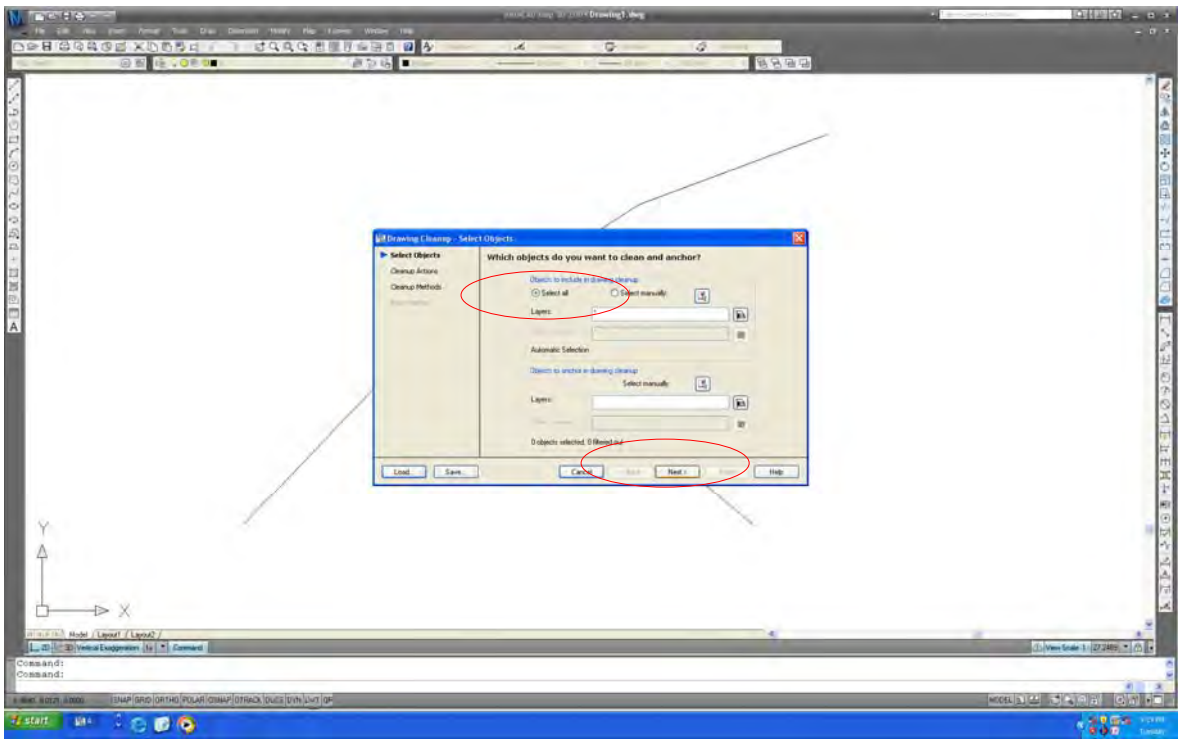


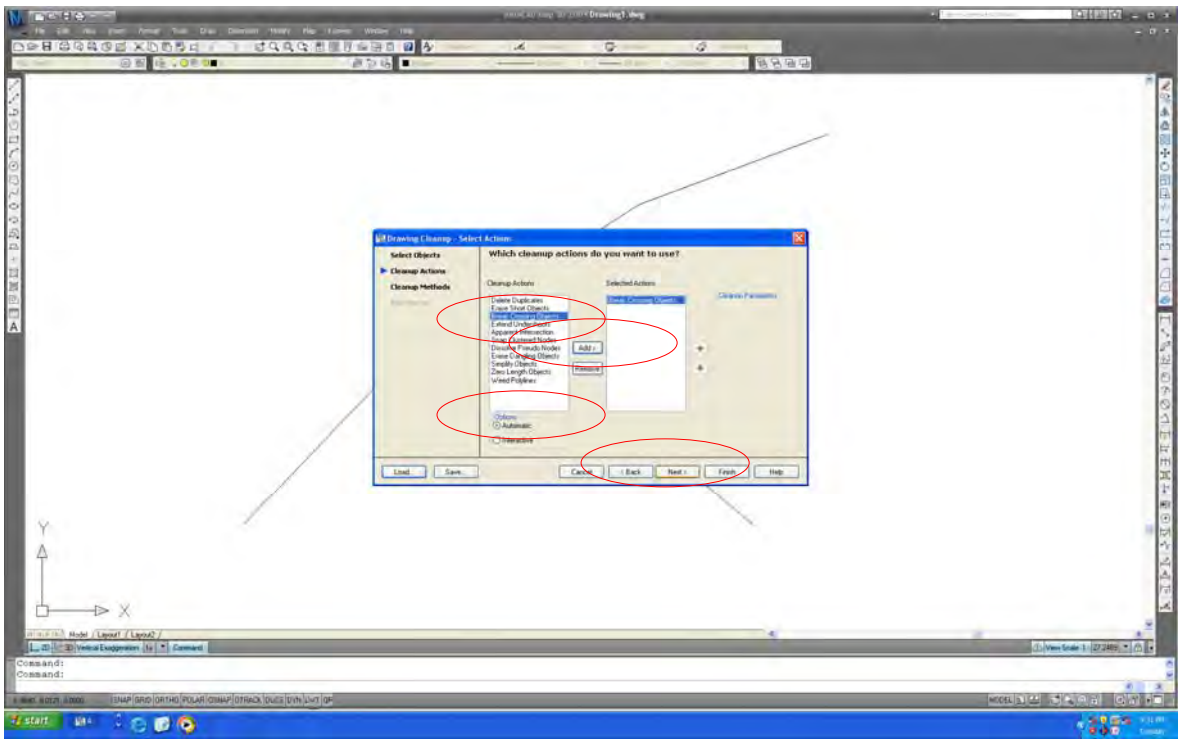
Image on AutoCAD Map3D



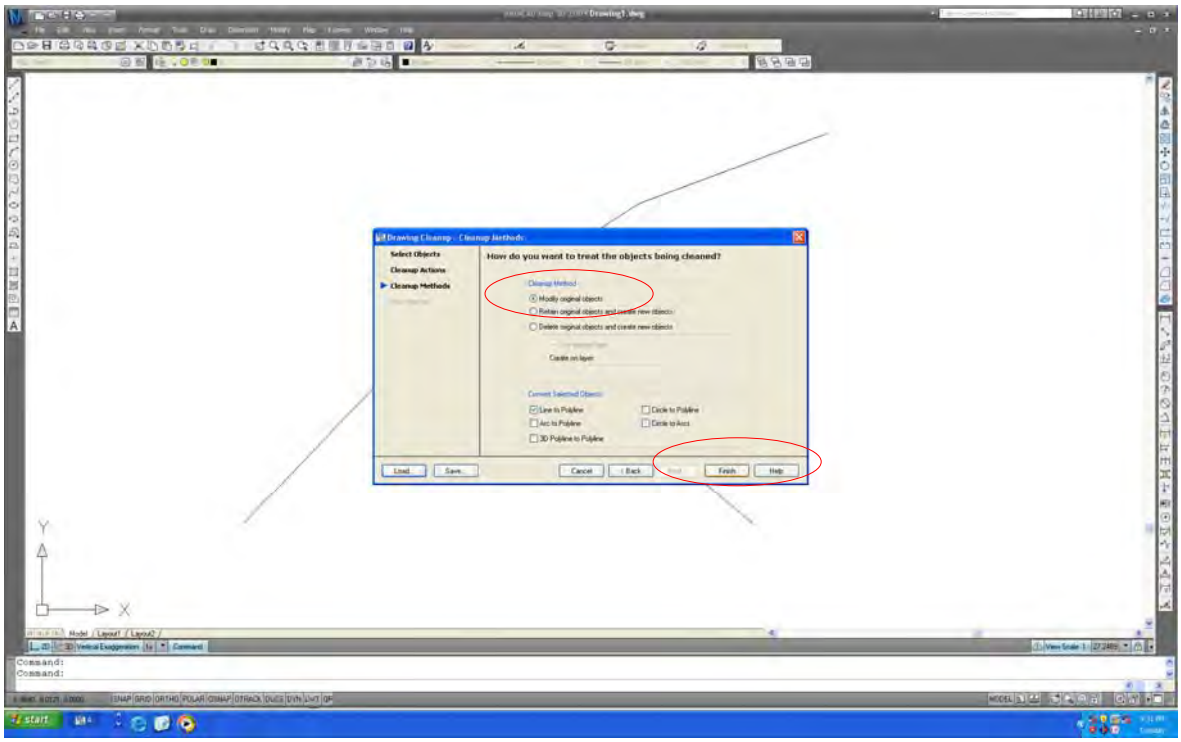
Select “Map”. Select “Tool”. Then, select “Drawing cleanup”.



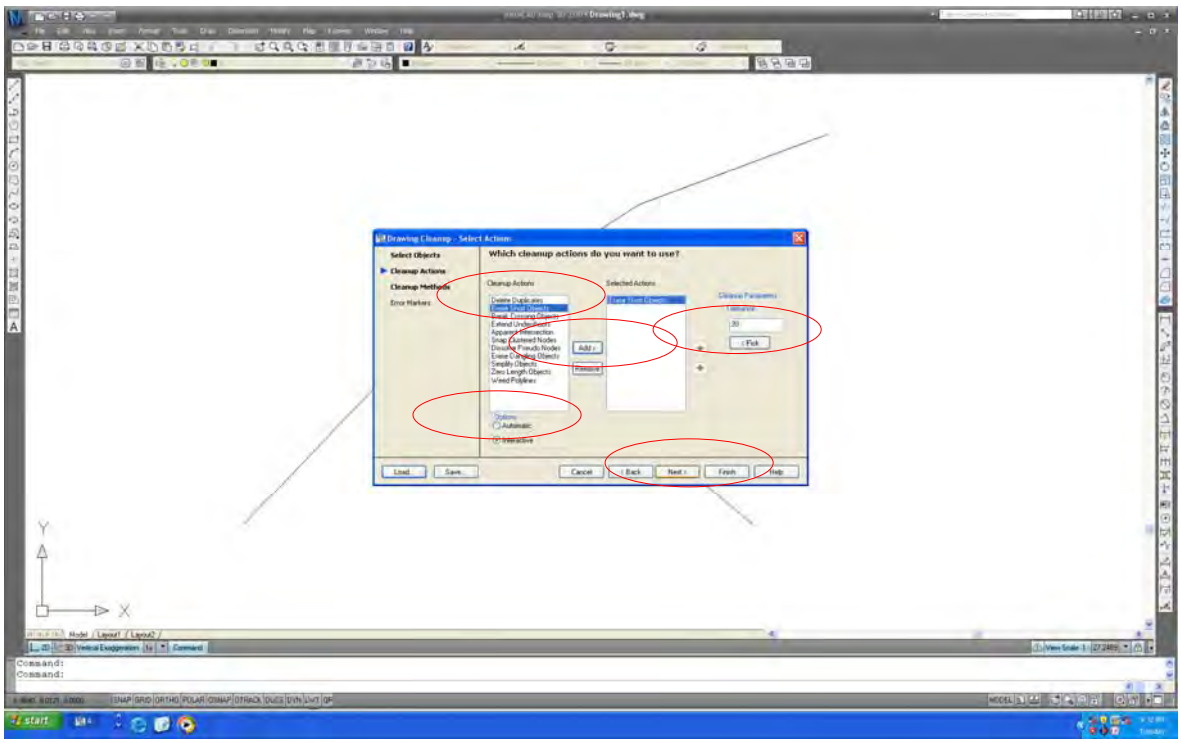
Select “Select all”. Then, select “Next”.



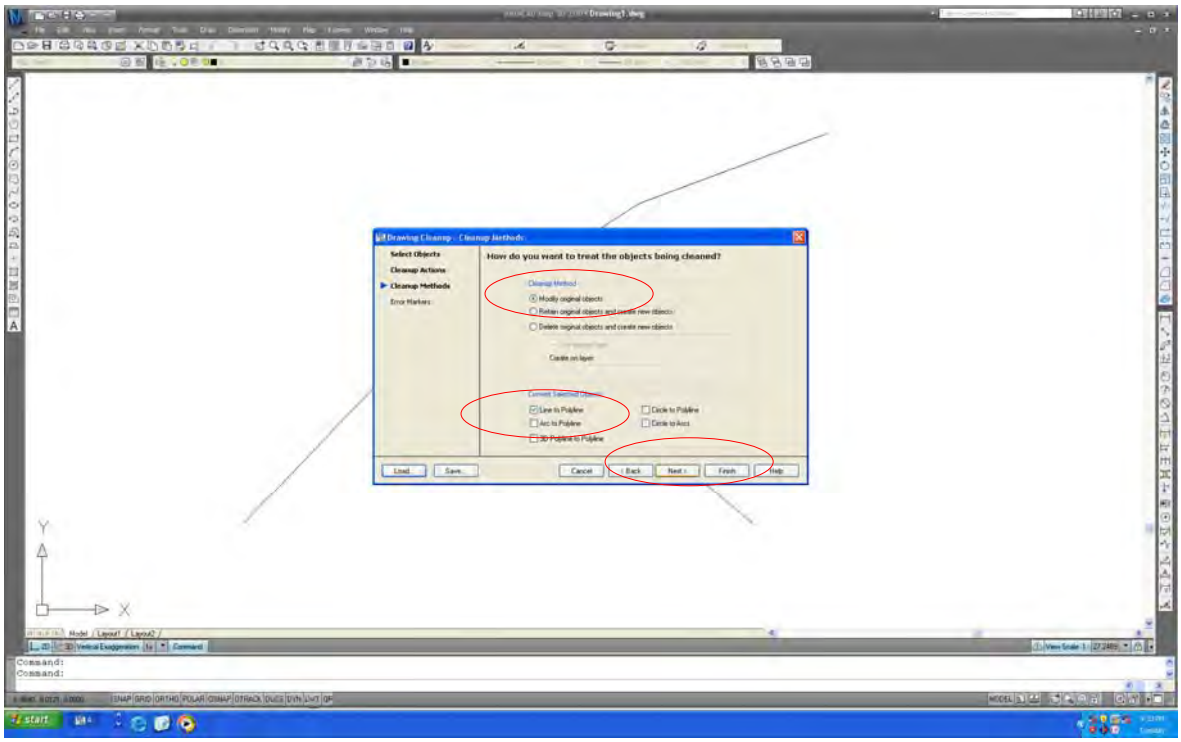
Select “Break Crossing Objects”. Select “Add”. Select “Automatic”. Then, select “Next”.



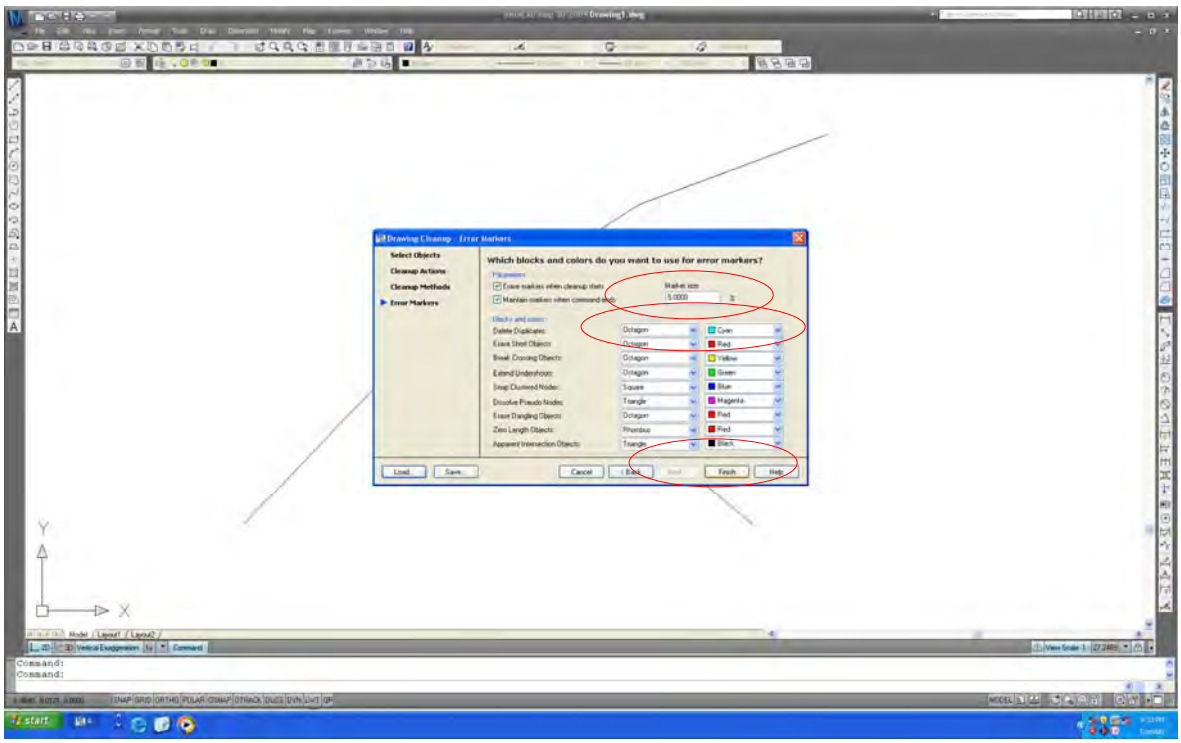
Select “Modify original objects”. Select “Line to Poly-line”. Then, select “Finish”.



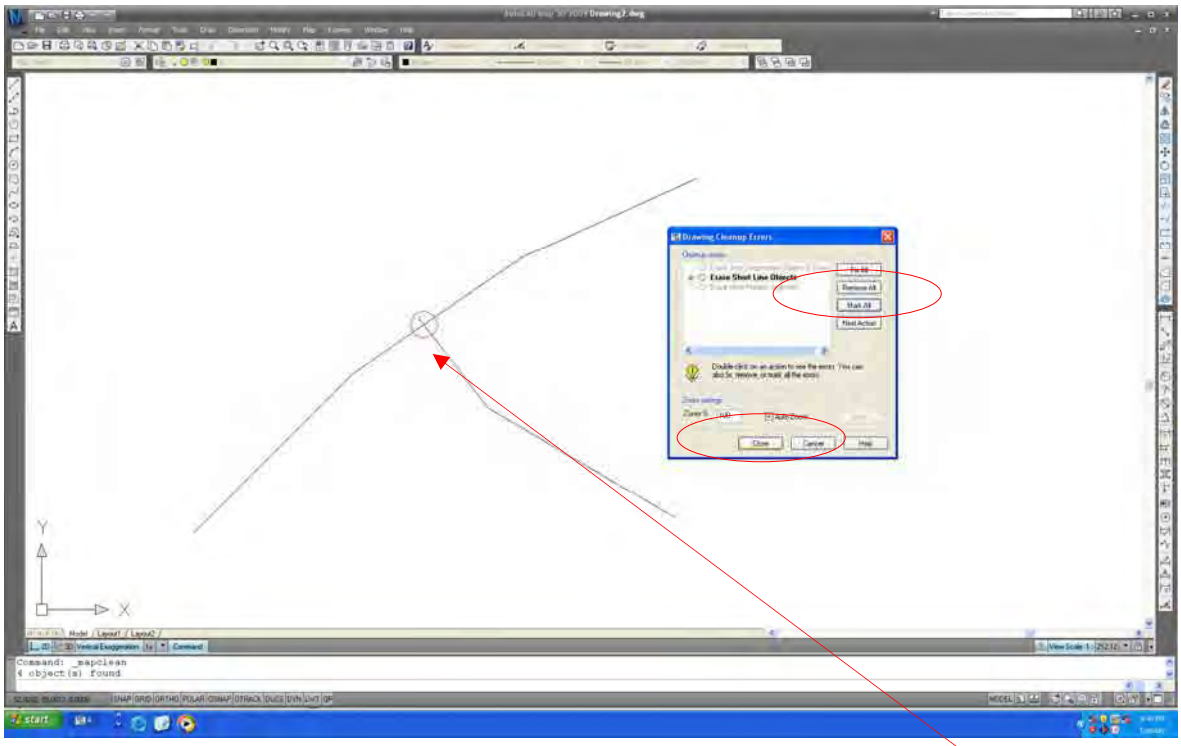
Select “Erase Short Object”. Select “Add”. Select “Interactive”. Set Up “Tolerance”. Then, select “Next”.



Select “Modify original object”. Select “Line to Poly-line”. Then, select “Next”.



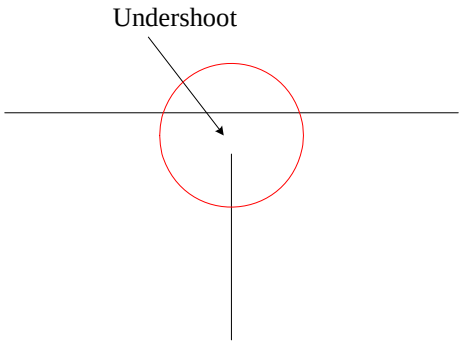
Set “Marker size”. Set “Marker shape and color”. Then, select “Finish”.



Select “Mark All”. Then, select “Close”. Error

6.3. Undershoot

1) **Sample of error**



2) How to detect the error

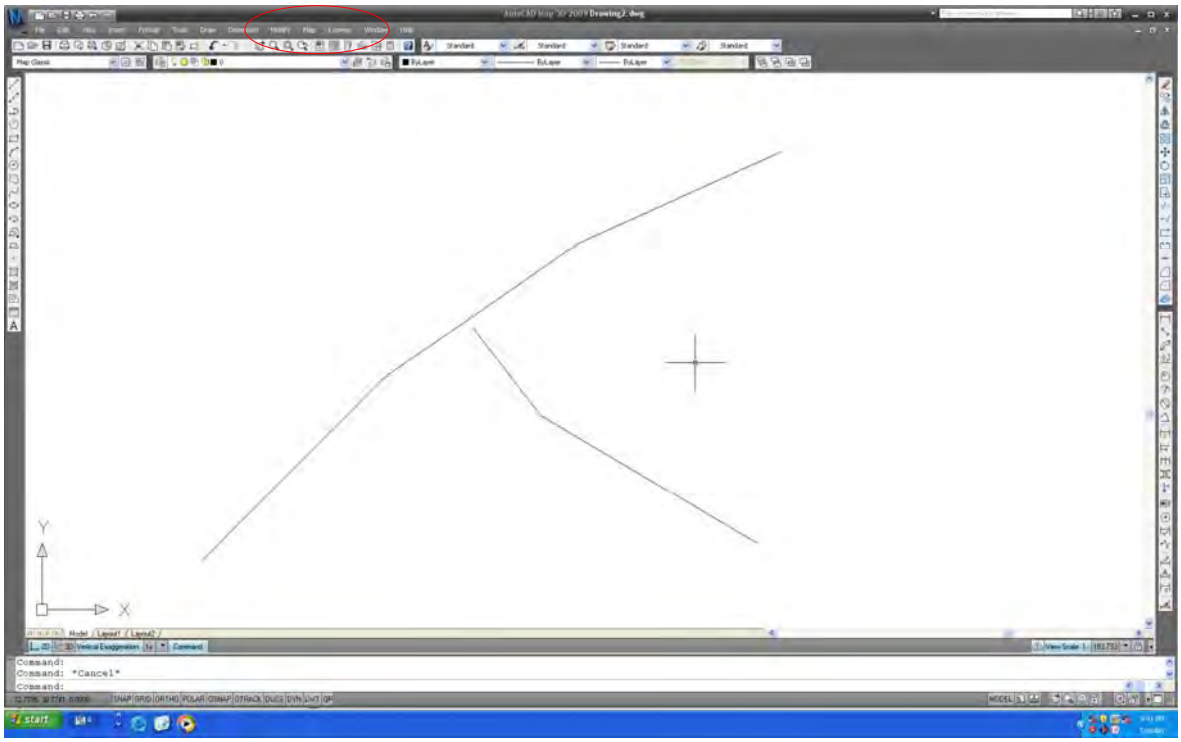
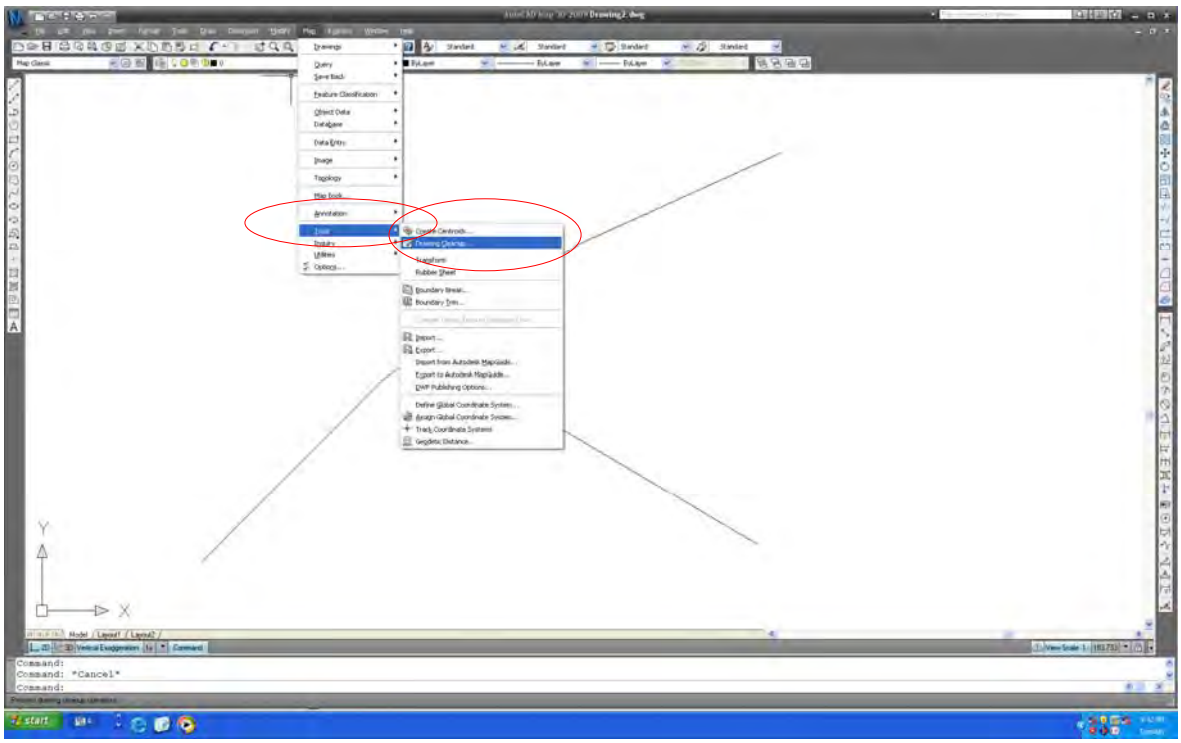
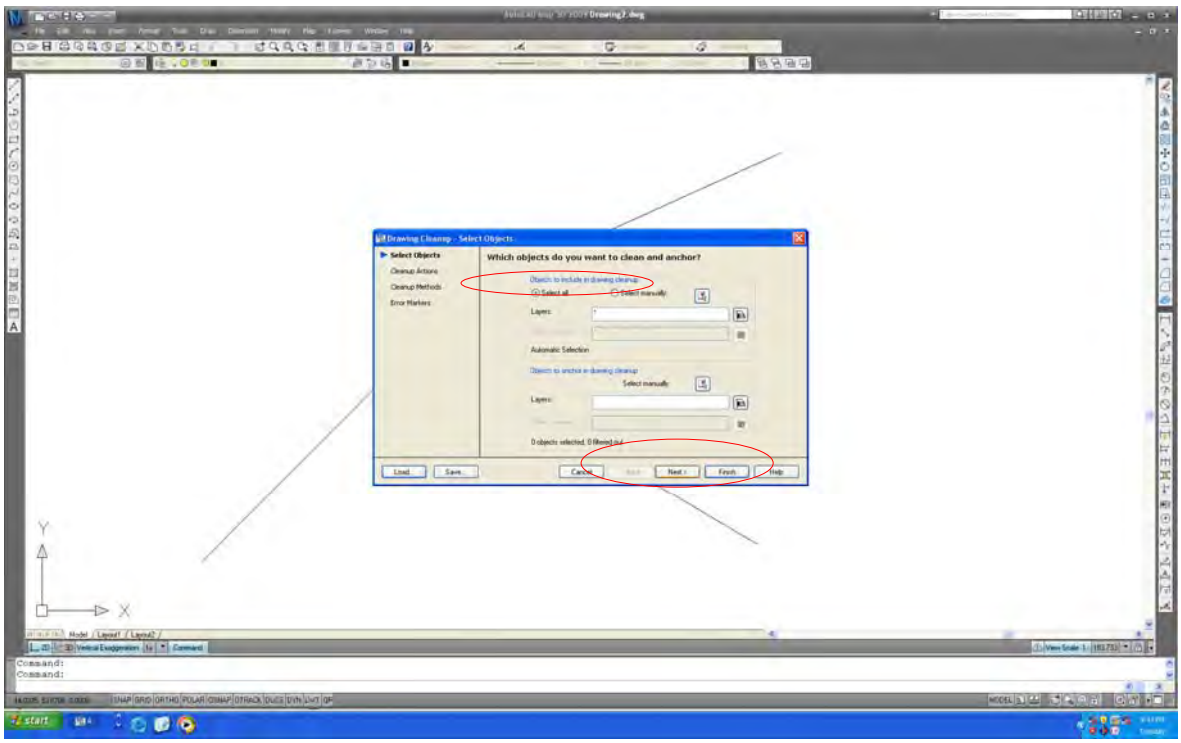


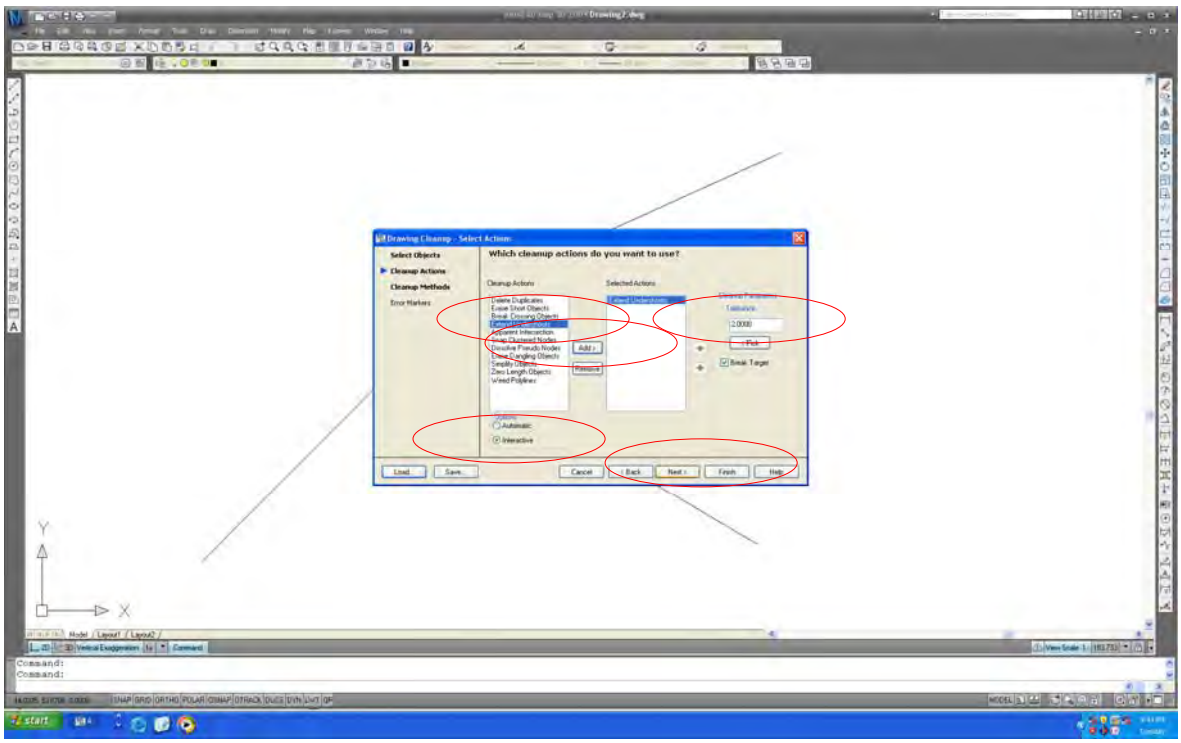
Image on AutoCAD Map3D



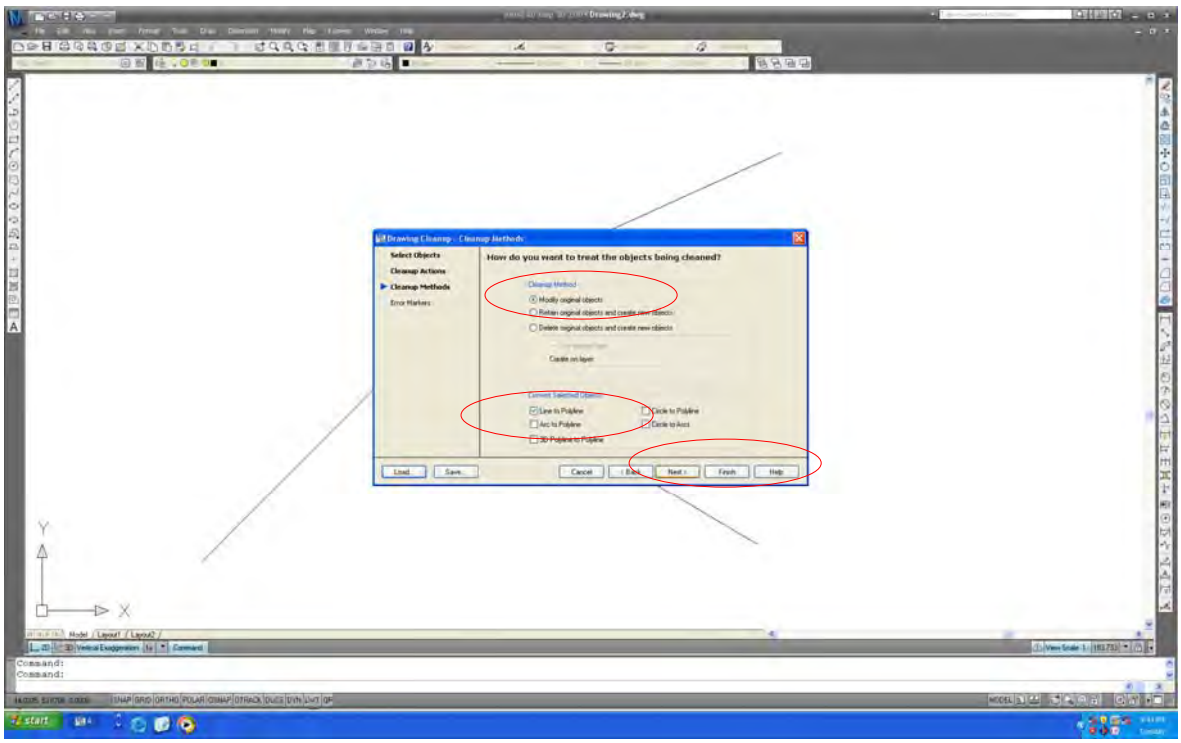
Select “Tool”. Select “Map clean up”.



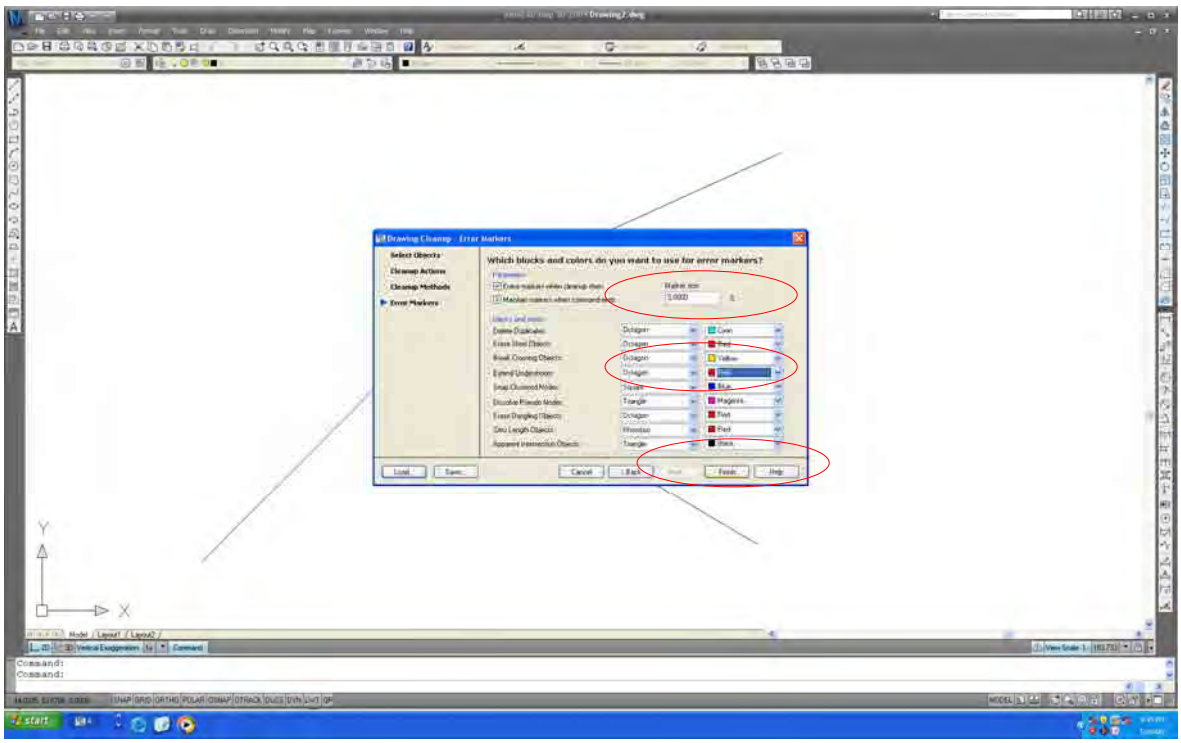
Select “All”. Then, select “Next”



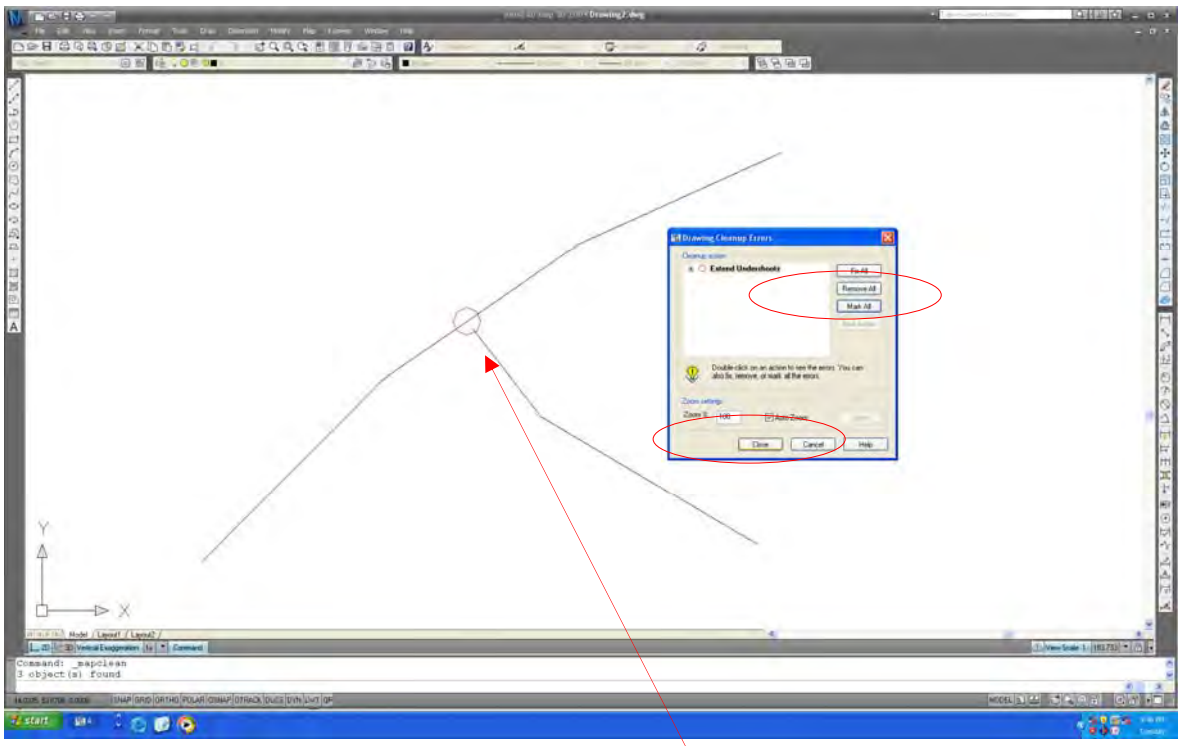
Select “Extend Undershoot”. Select “Add”. Set up “Tolerance”. Select “Interactive”. Then, select “Next”.



Select “Modify original objects”. Select “Line to poly-line”. Then, select “Next”.



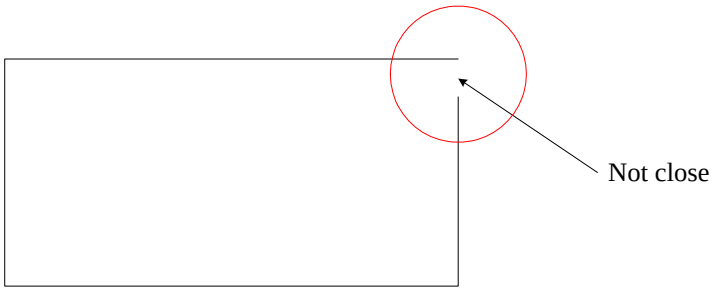
Set up “Marker size” Select “Shape and color of marker”. Then, select “Finish”.



Select “Mark all”. Then, select “Clause”.

6.4. Unclosed Polygon or Poly-line

1) Sample of error



2) How to detect the error

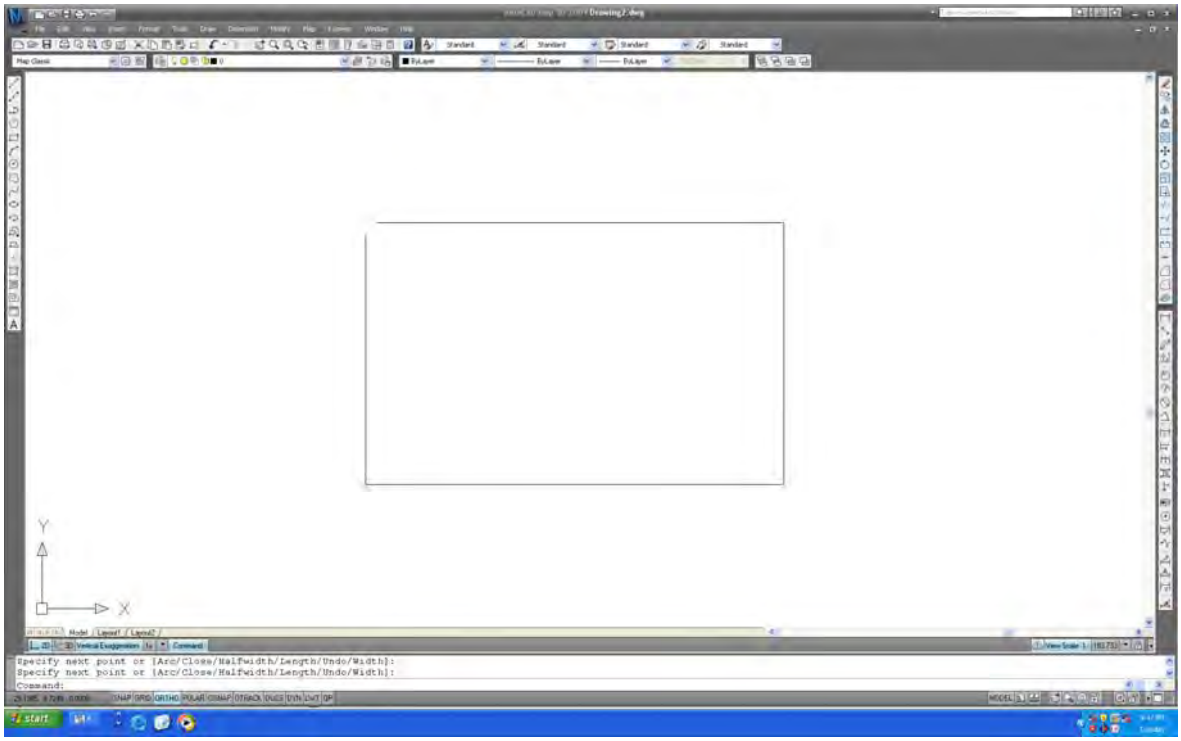
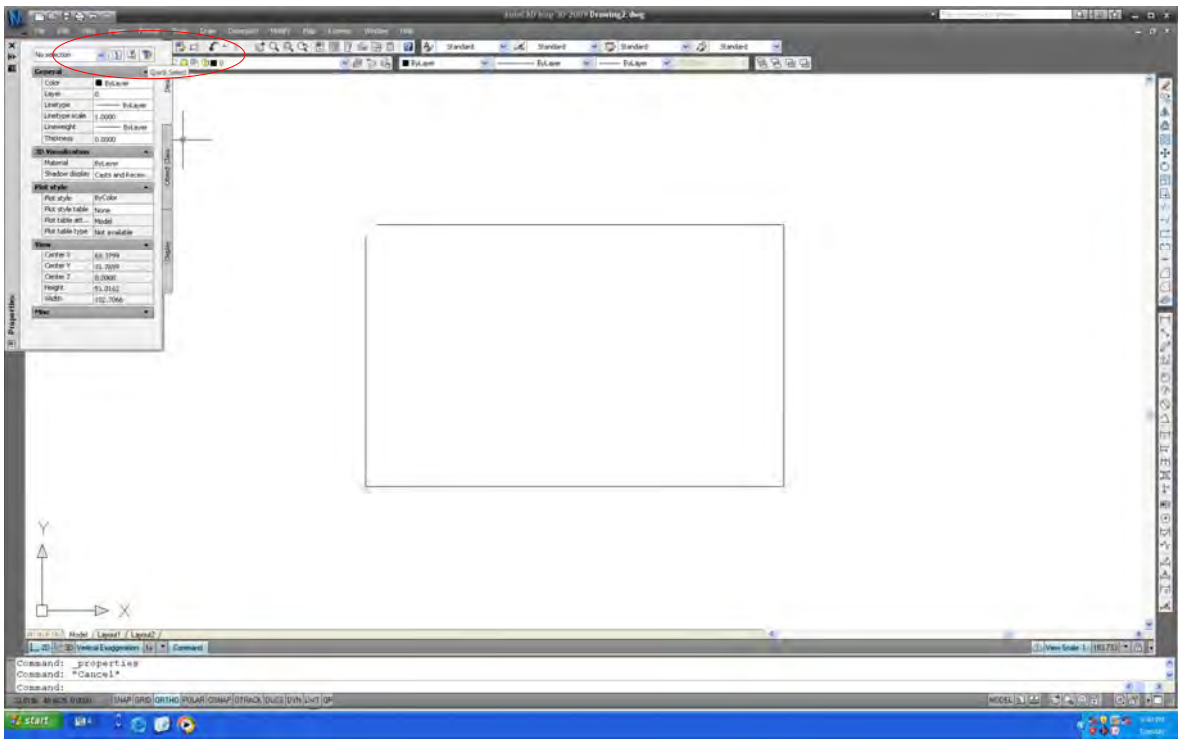
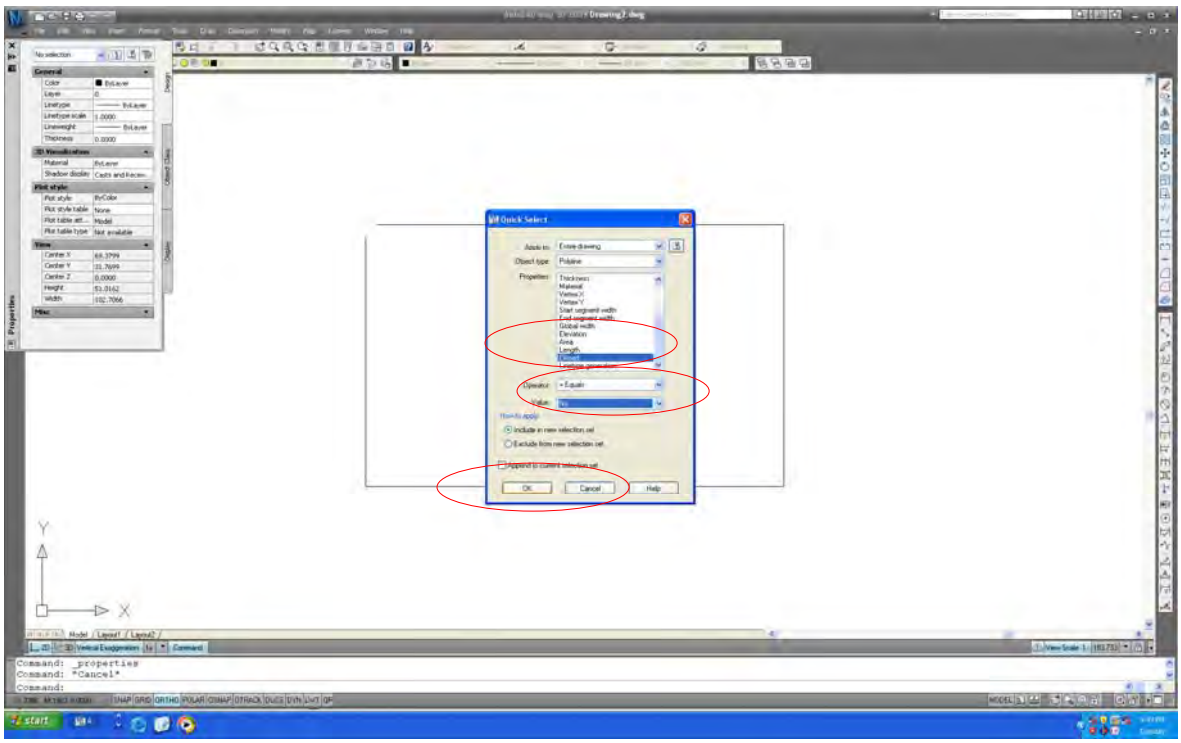


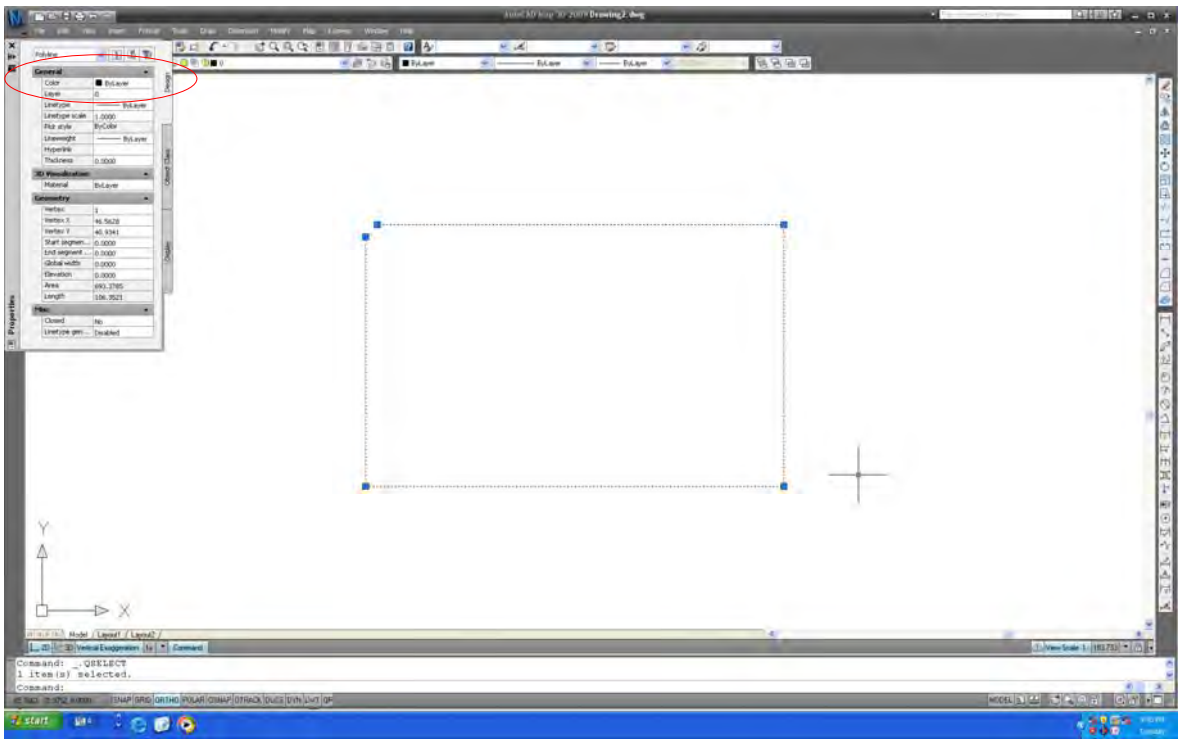
Image on AutoCAD Map3D



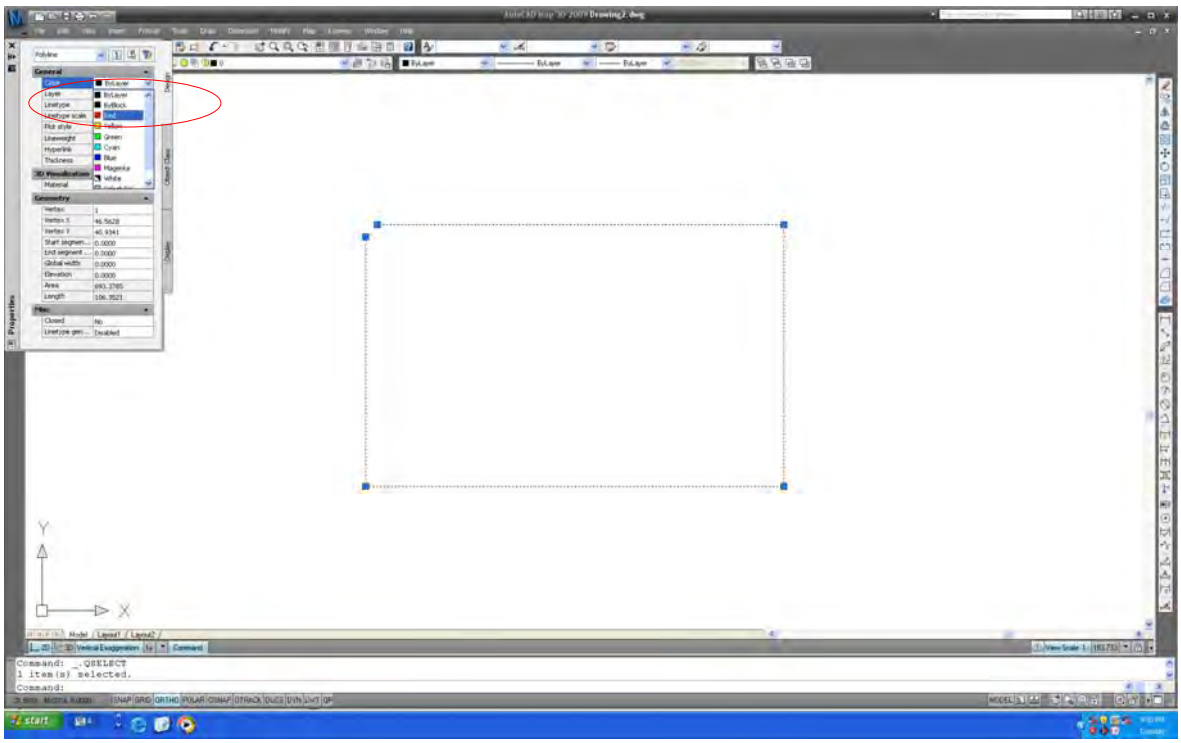
Open “Properties”. Select “Quick select”.



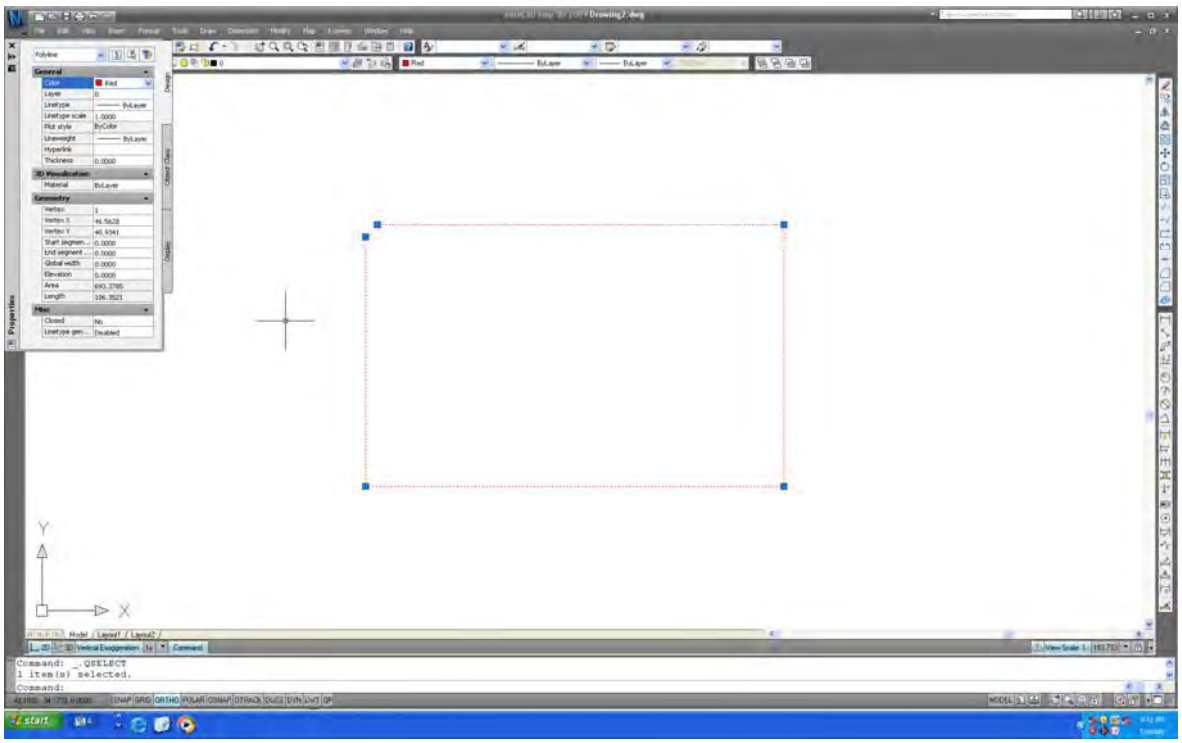
Select “Closed”. Select “No”. Then, select “OK”.



Select “Color”.



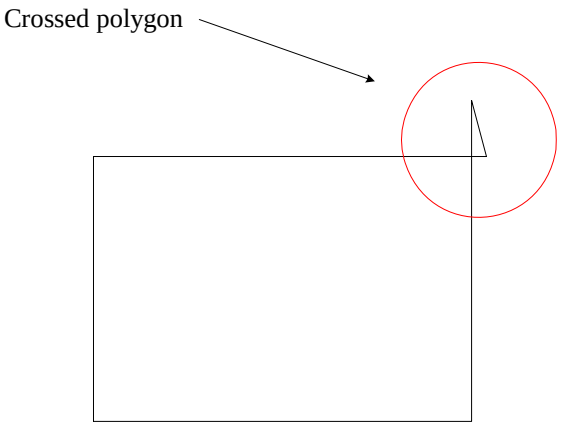
Change color to “Red” or other color.



The color of unclosed poly-line will change to red color.

6.5. Crossed Polygon

1) Sample of error



2) How to detect the error

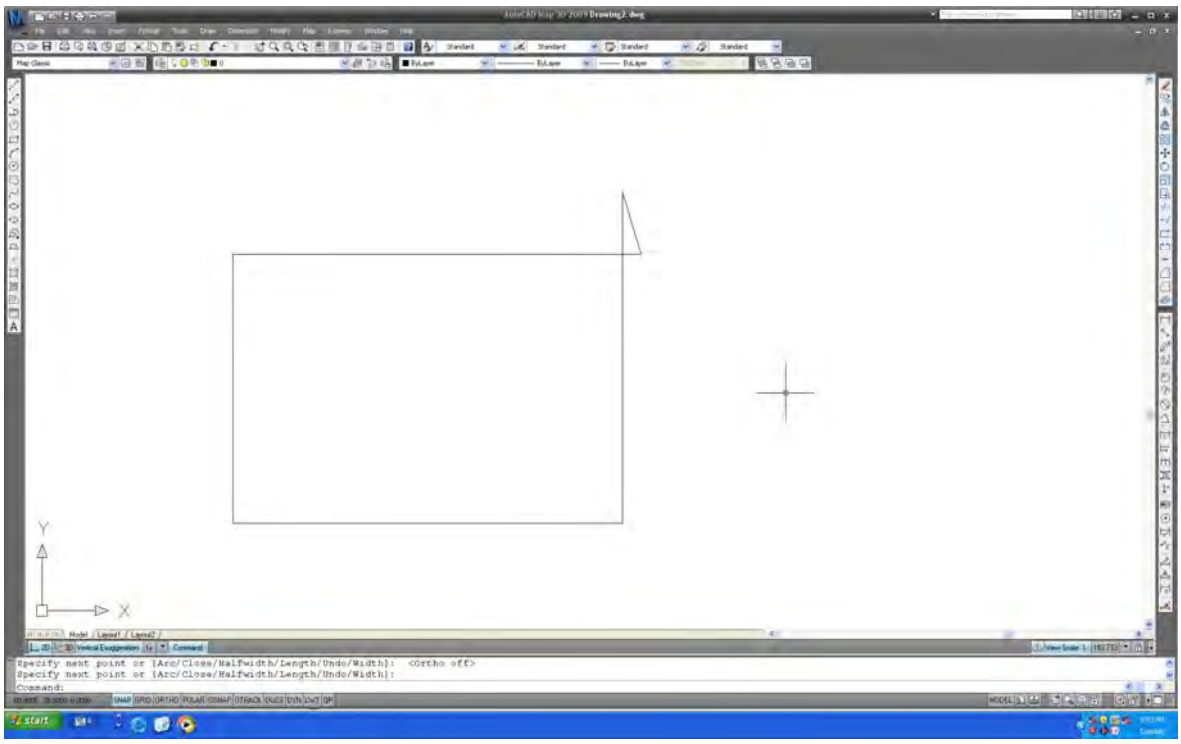
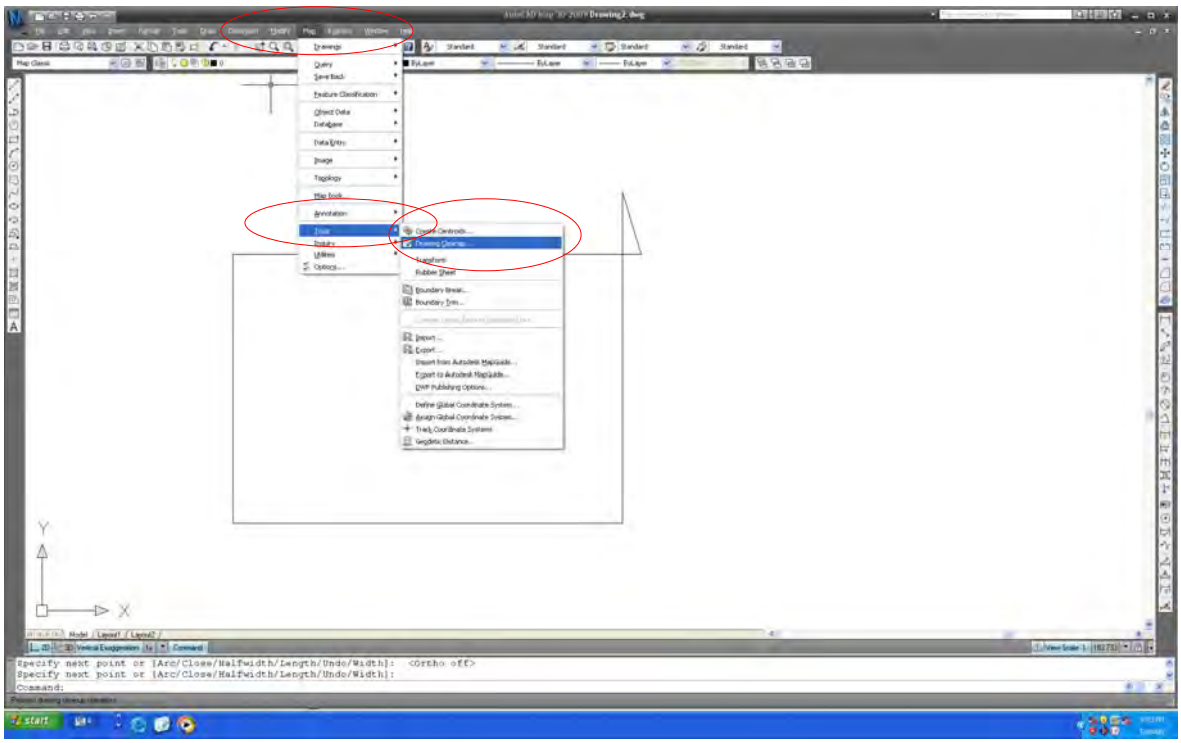
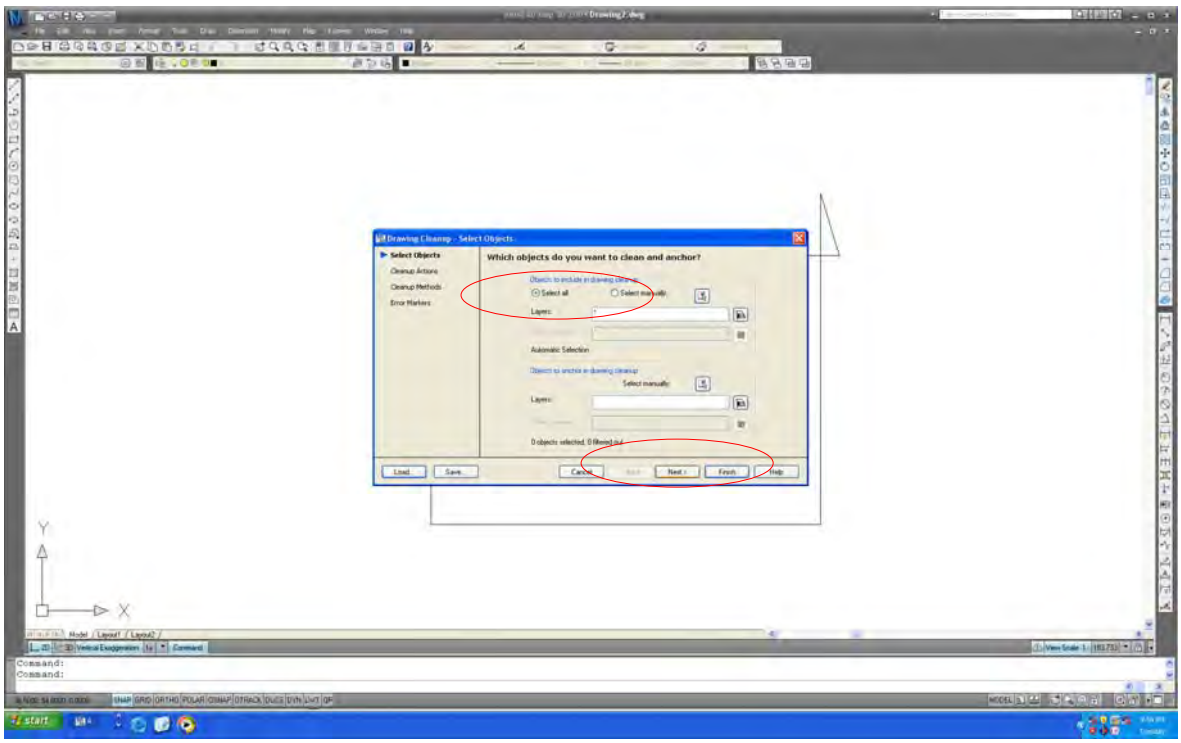


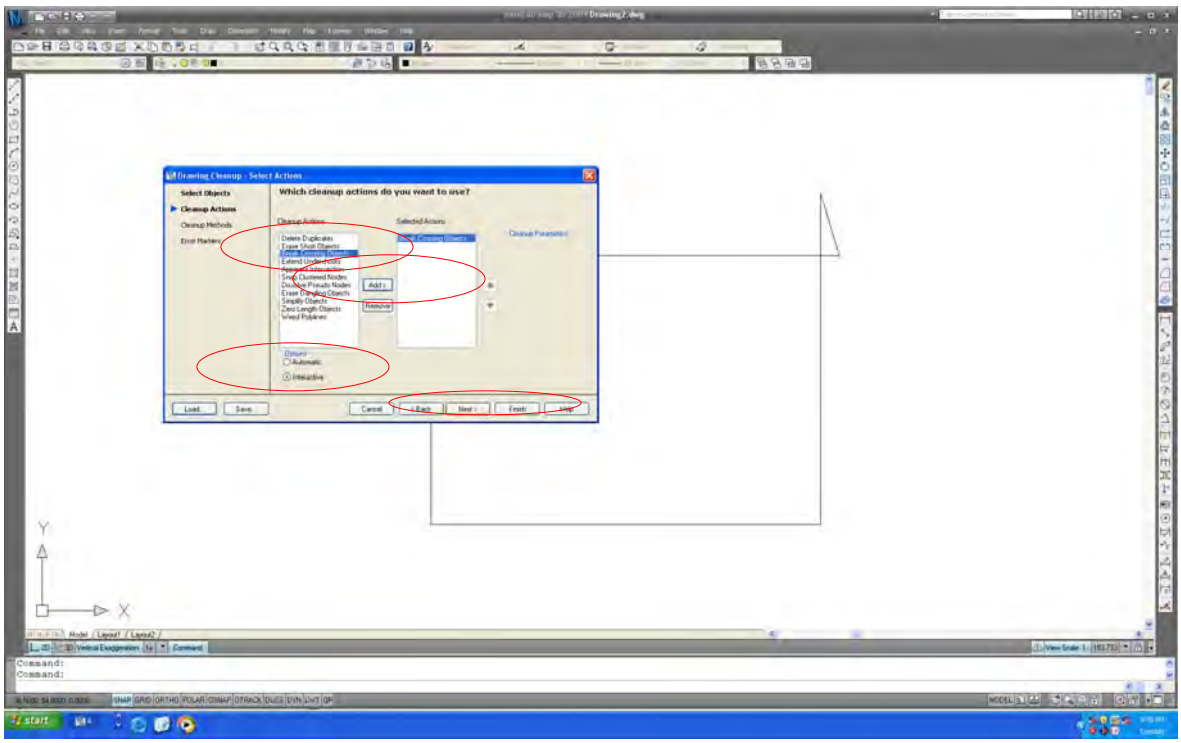
Image on AutoCAD Map3D



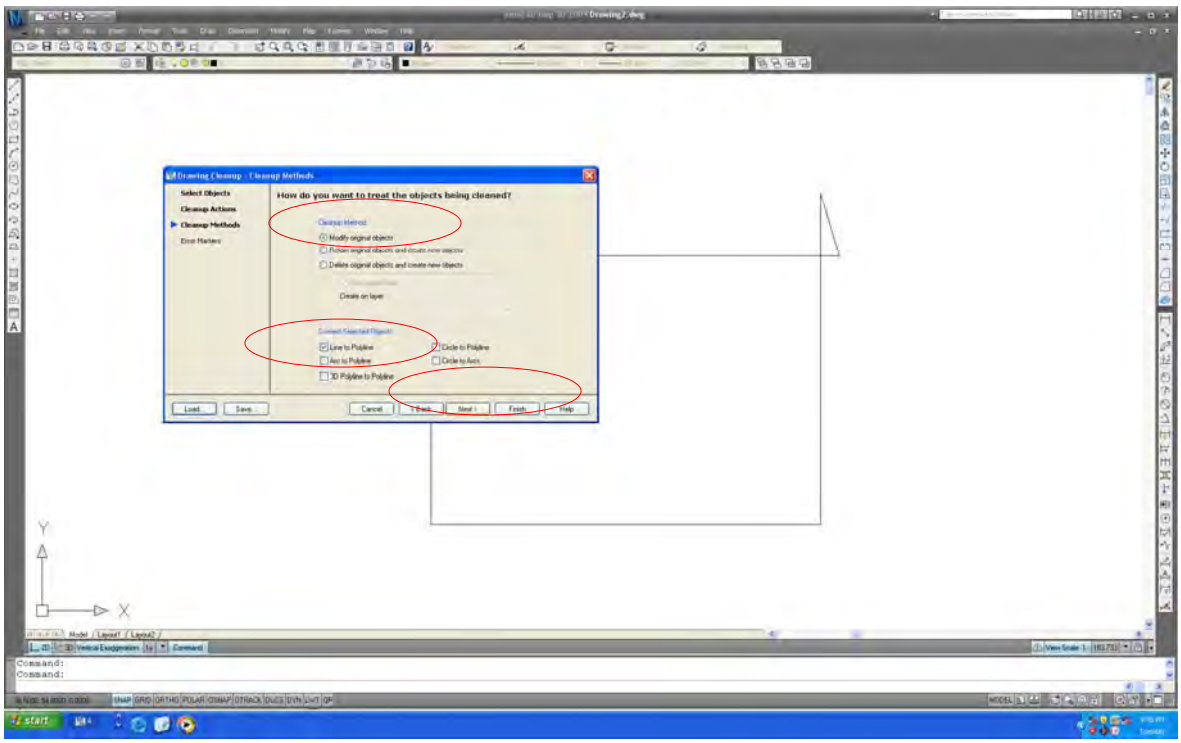
Select “Map”. Select “Tool”. Select “Drawing cleanup”.



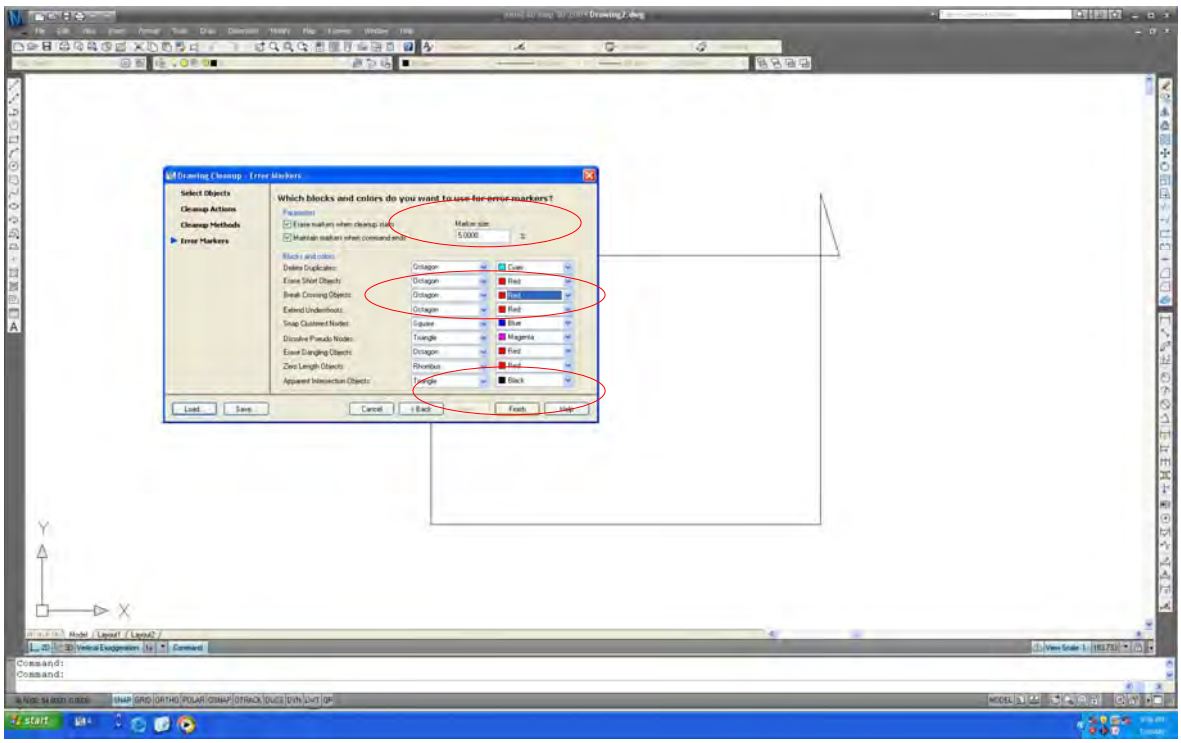
Select “Select all”. Then, select “Next”.



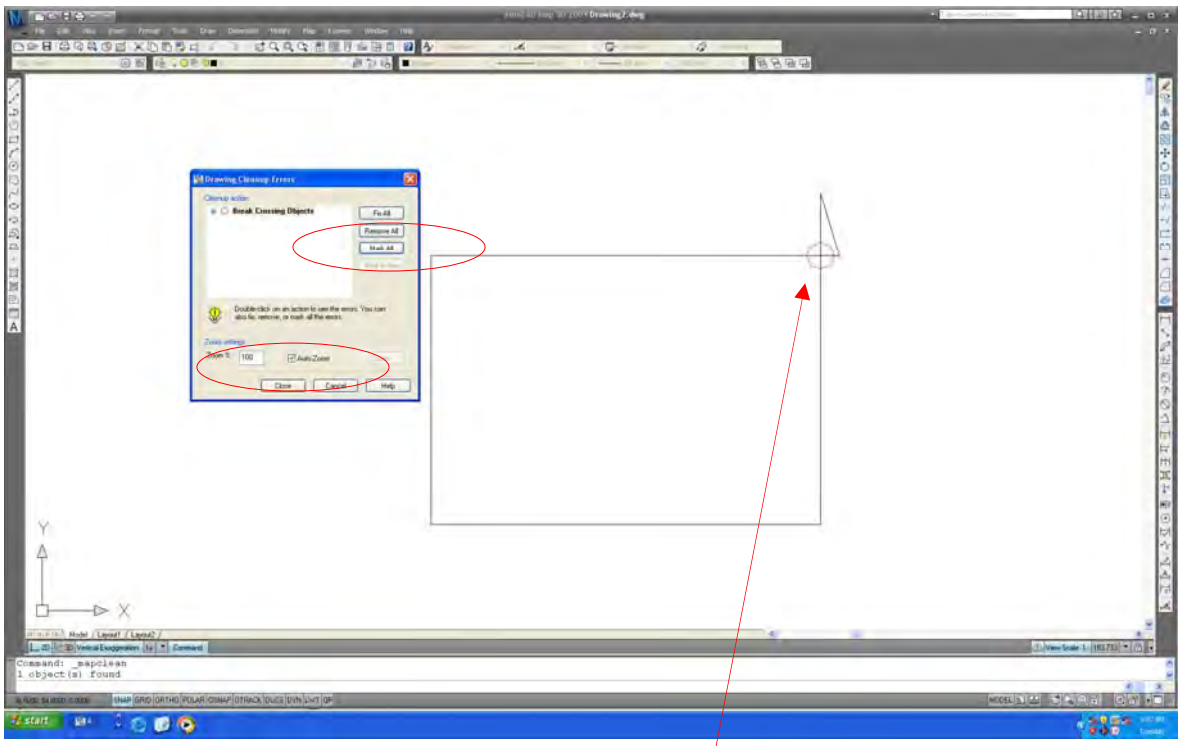
Select “Break crossing object”. Select “Add”. Select “Interactive”. Then, select “Next”.



Select “Modified original objects”. Select “Line to poly-line”. Then, select “Next”.



Set up “Marker size”. Select “Shape and color of marker”. Then, select “Finish”.

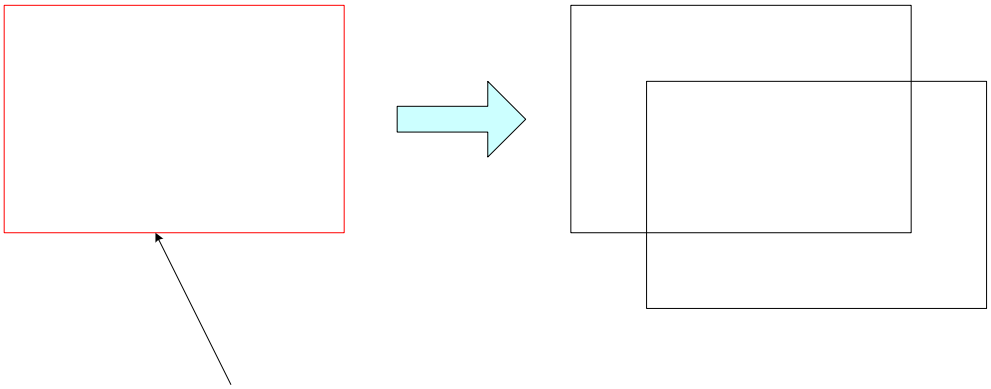


Select “Mark all”. Then, select “Close”.

Error

6.6. Double Object

1) Sample of error



Same shape of object locates at same position

2) How to detect the error

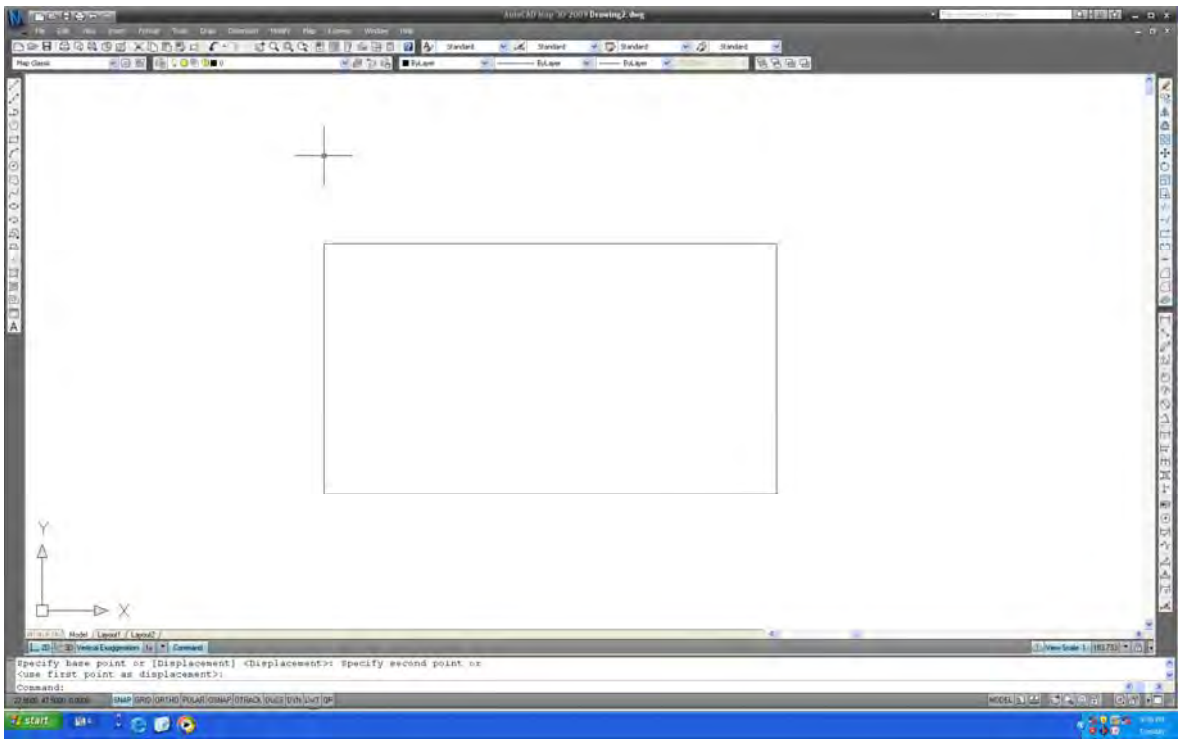
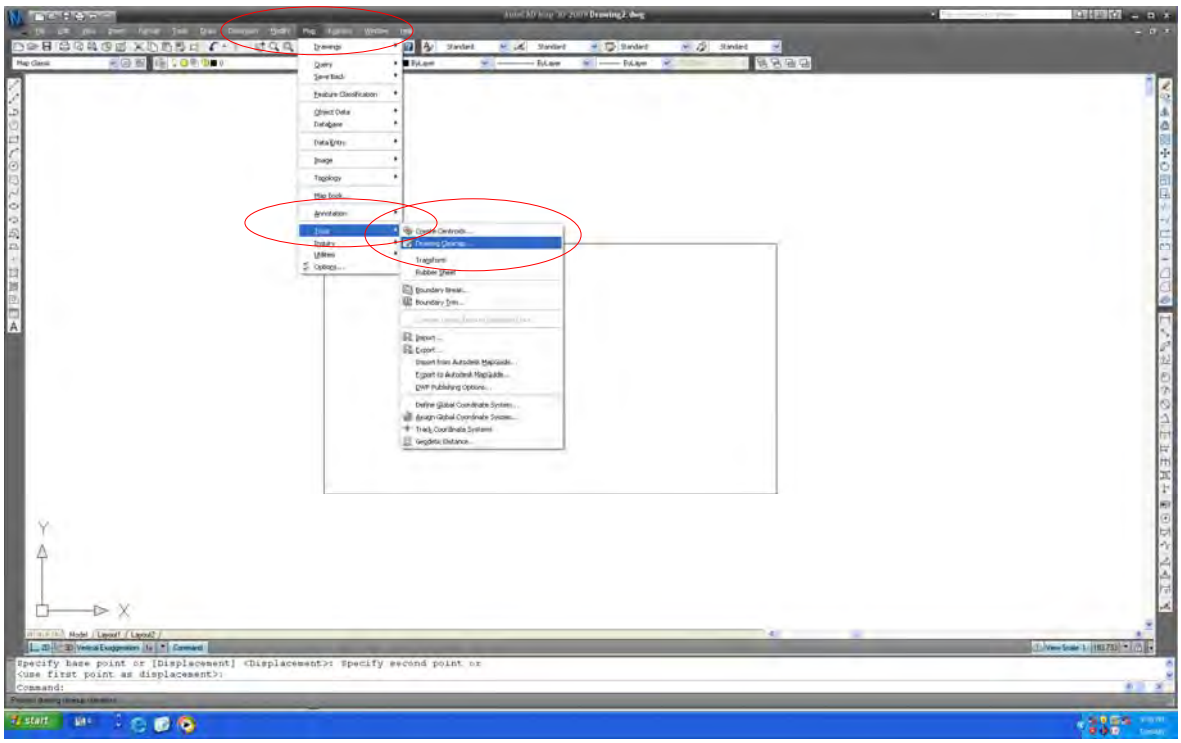
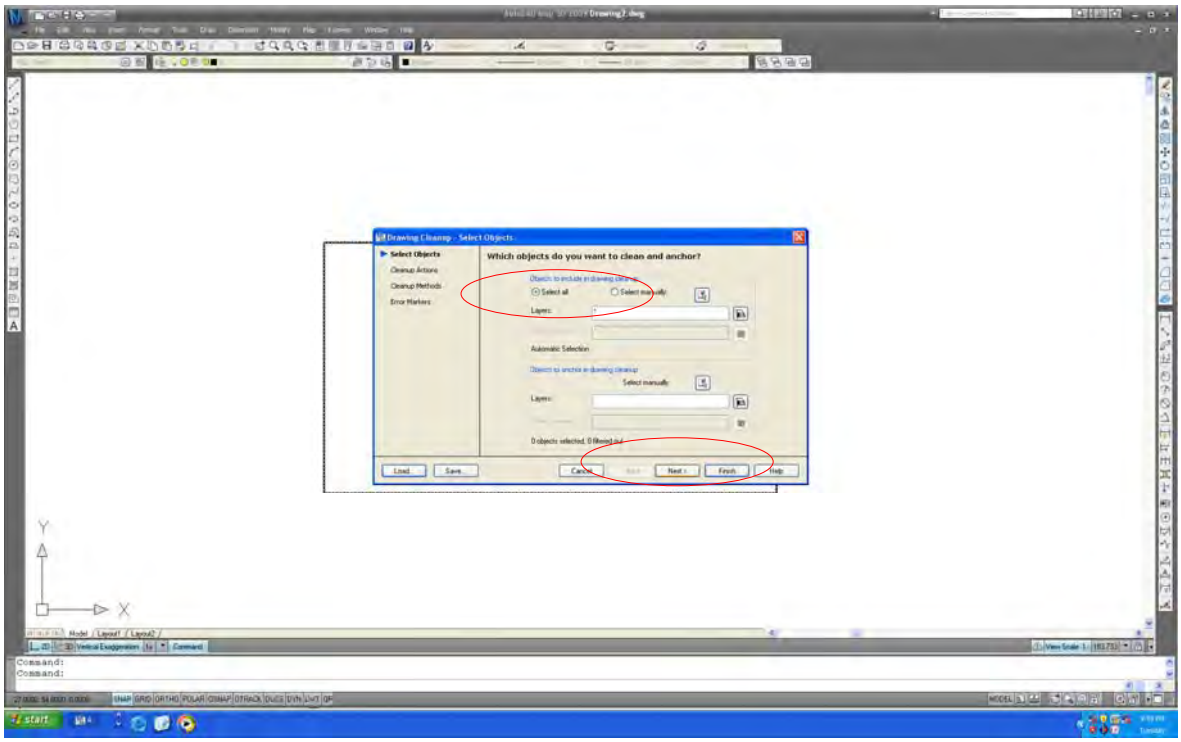


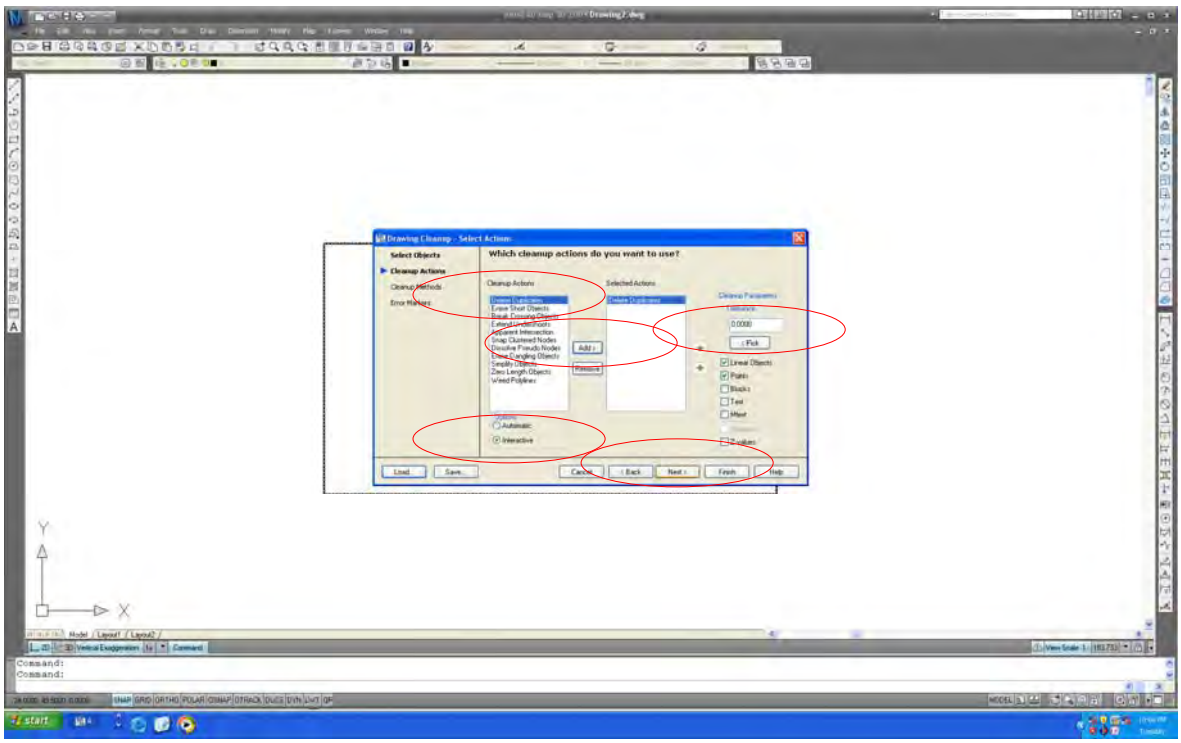
Image on AutoCAD Map3D



Select “Map”. Select “Tool”. Then, select “Drawing cleanup”.

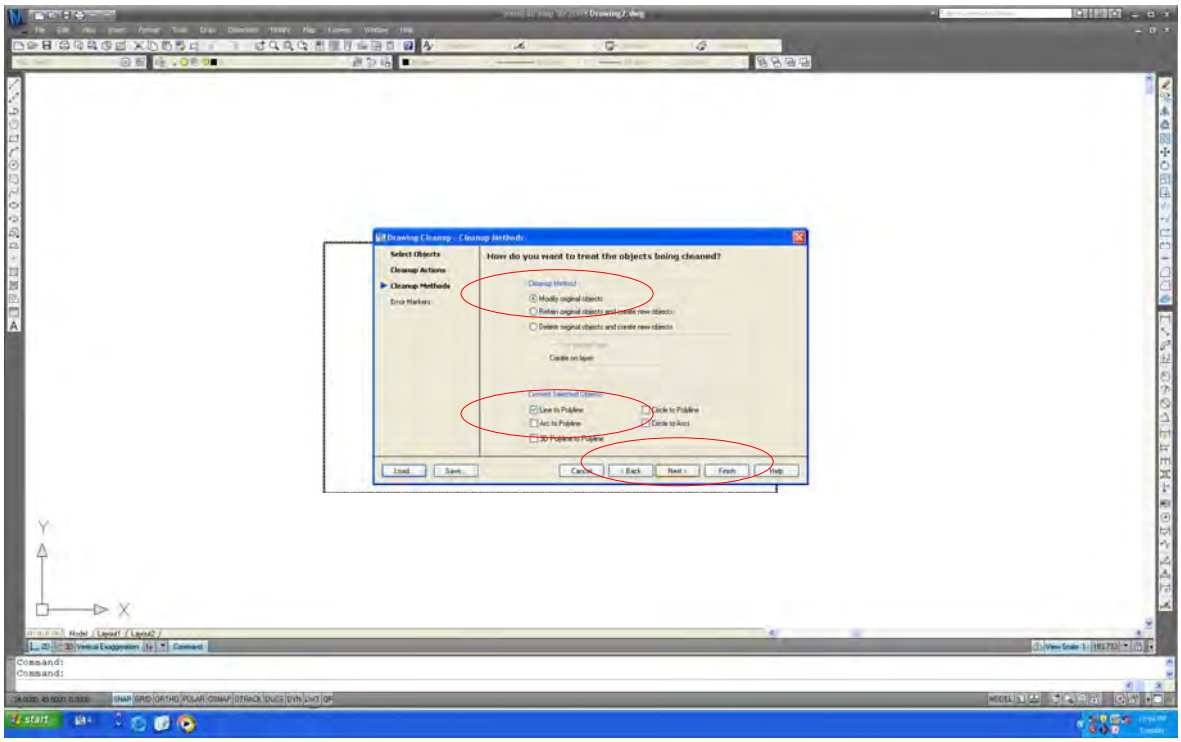


Select “Select all”. Then, select “Next”.

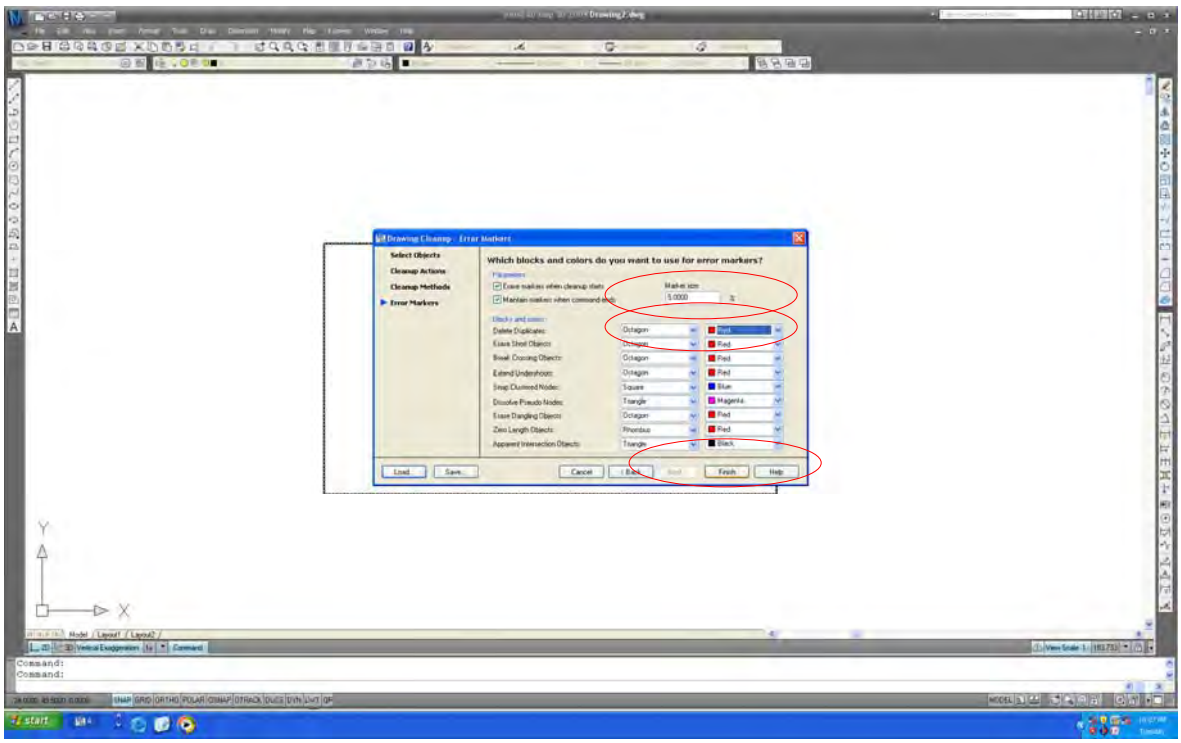


Select “Delete duplicates”. Select “Add”. Select “Interactive”. Tolerance is “0”.

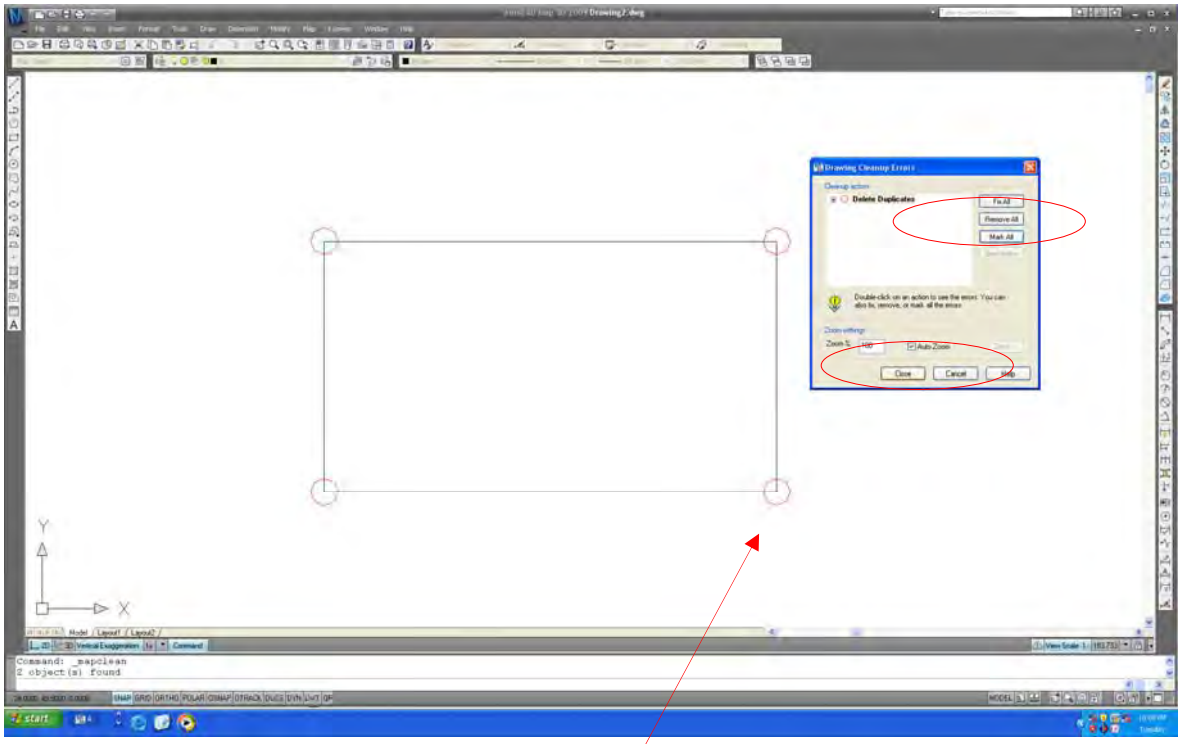
Then, select “Next”.



Select “Modify original objects”. Select “Line to poly-line”. Then, select “Next”.



Set “Marker size”. Set “Marker shape and color”. Then, select “Finish”.



Select “Mark all”. Then, select “Clause”.

Error

6.7. Zero Length Object

1) Sample of error

Zero length object means the starting and ending point of line
are located at the same position

2) How to detect the error

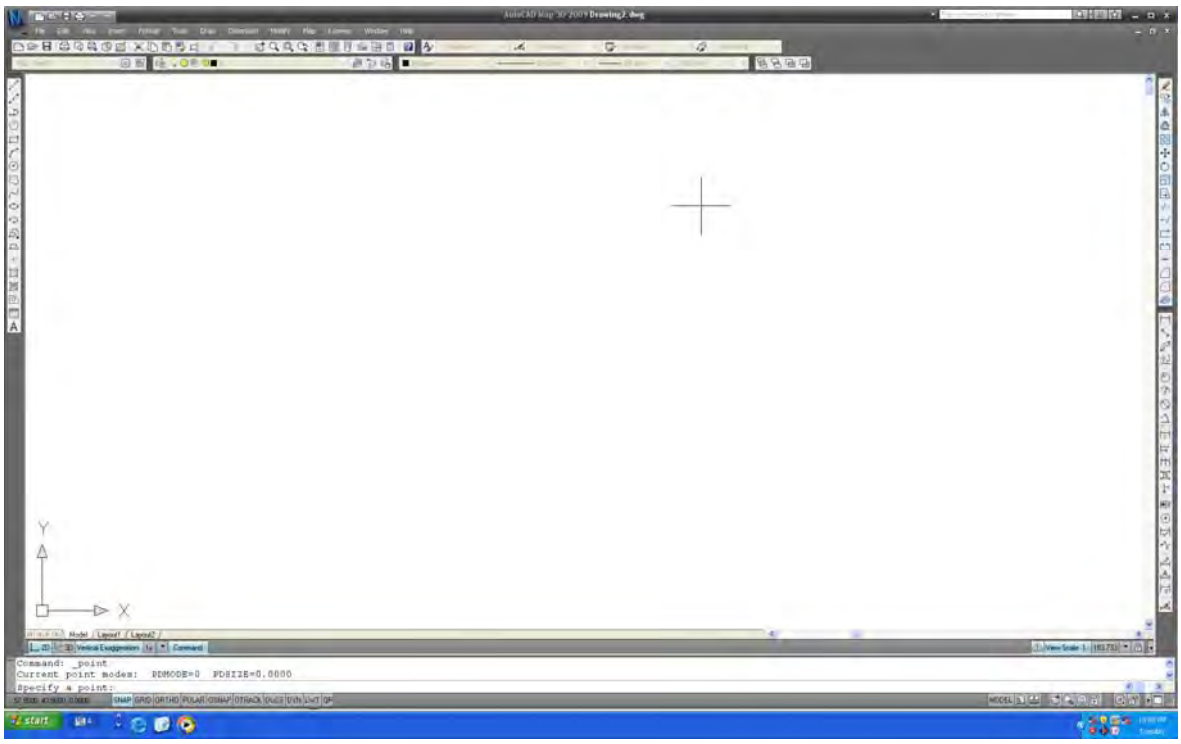
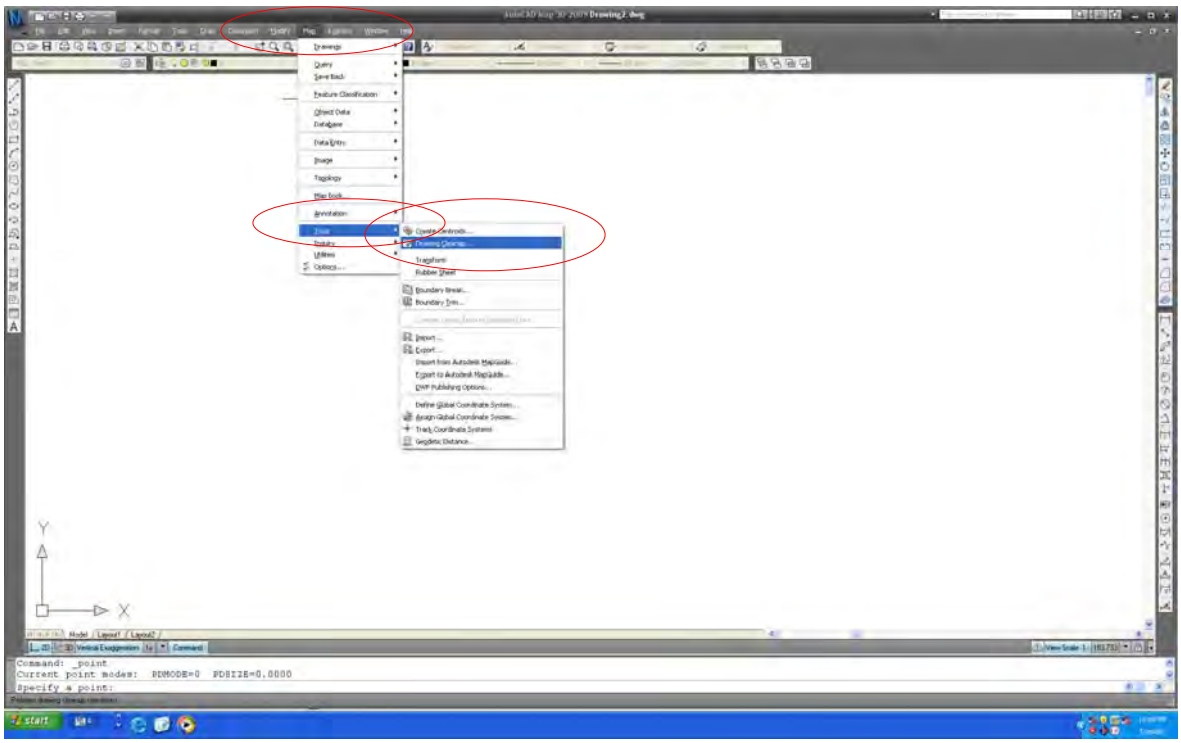
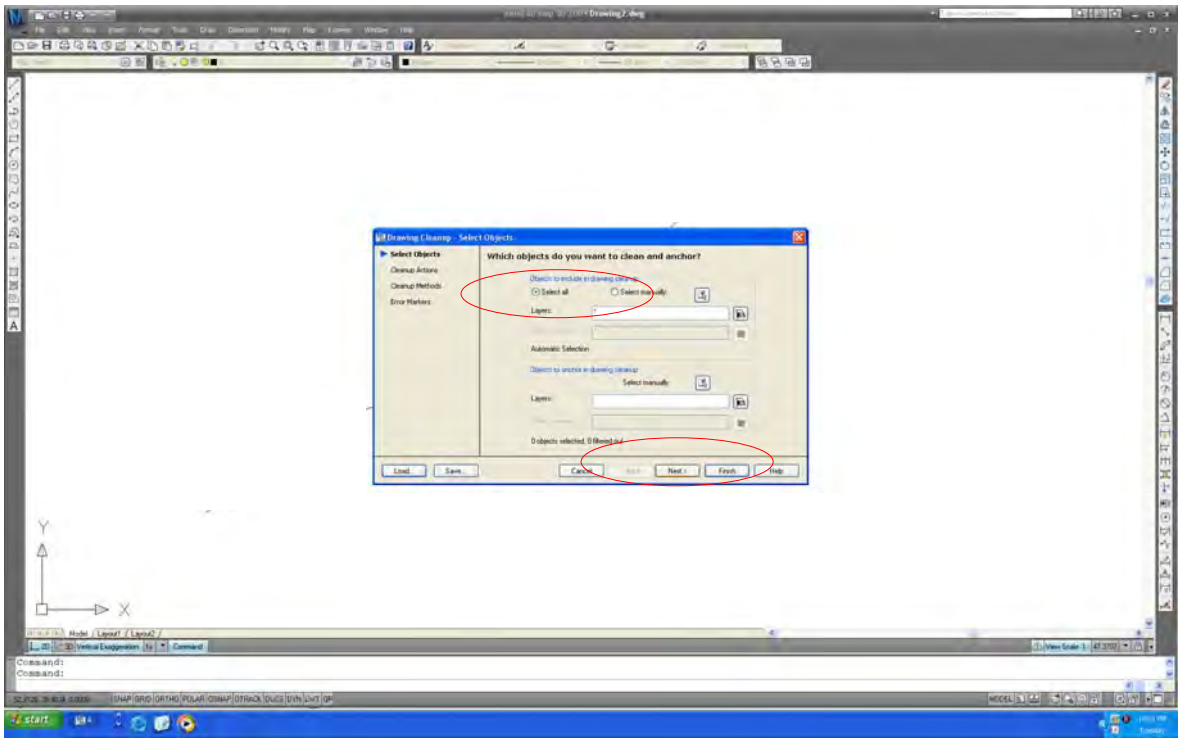


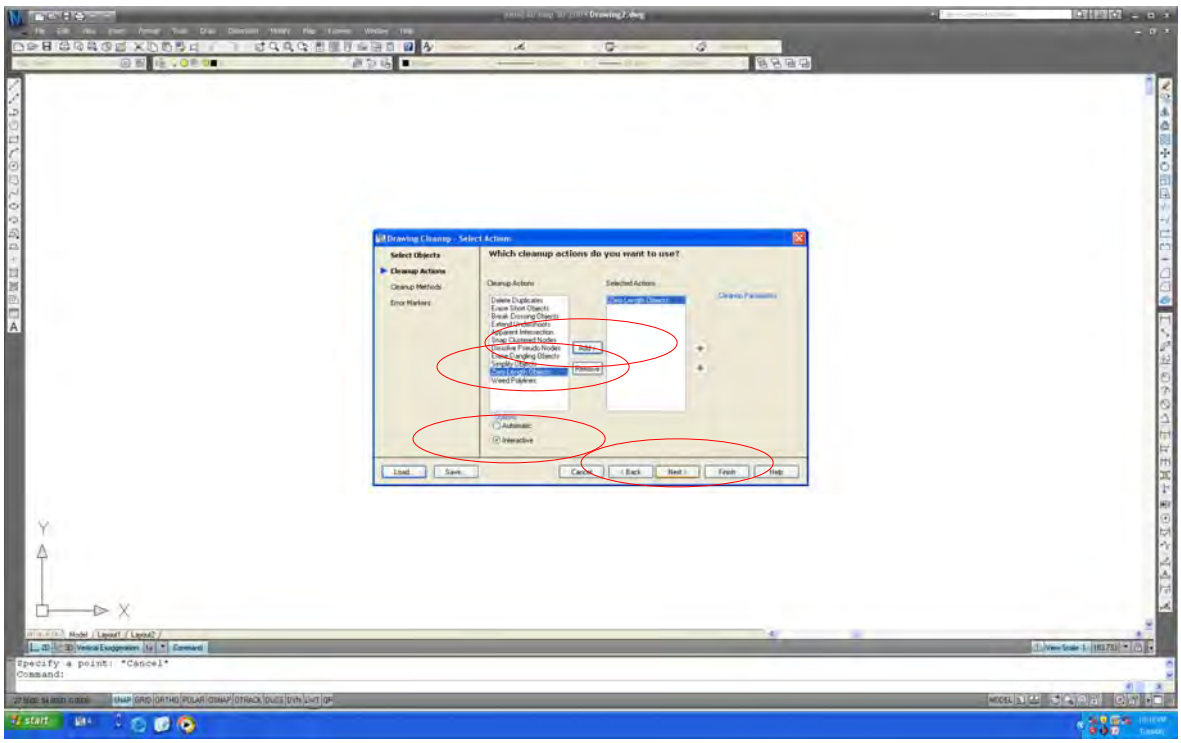
Image on AutoCAD Map3D



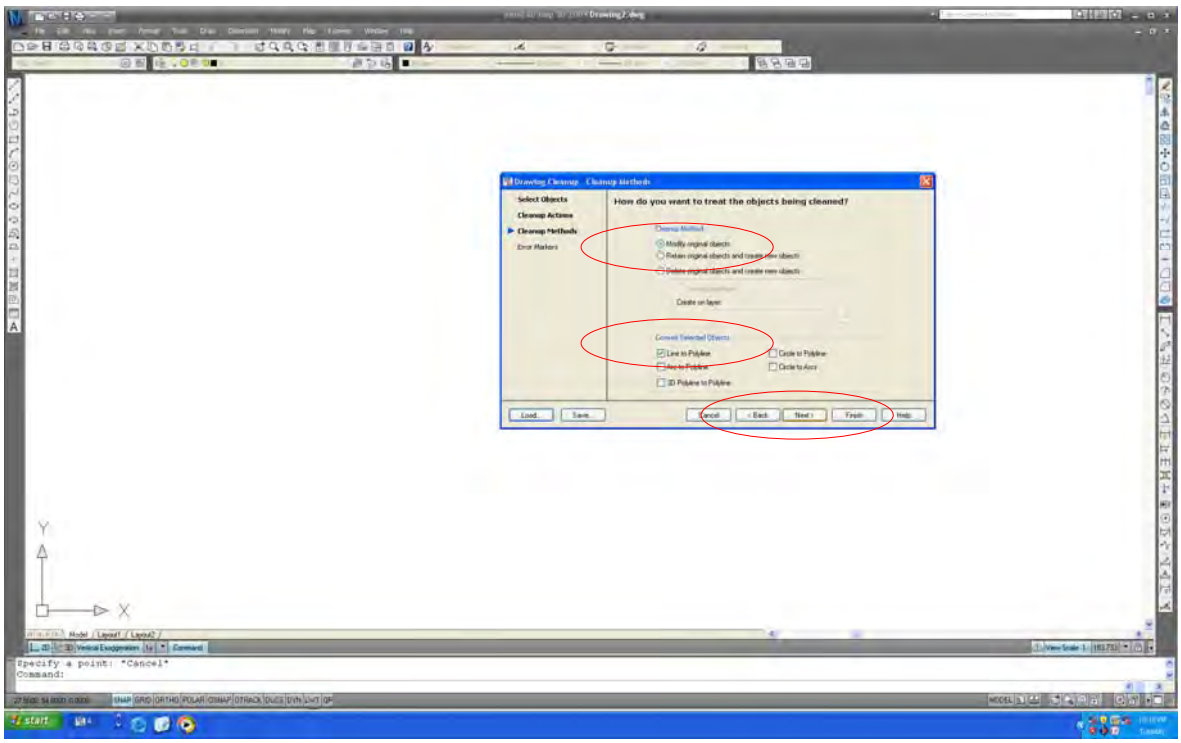
Select “Map”. Select “Tool”. Then, select “Drawing cleanup”.



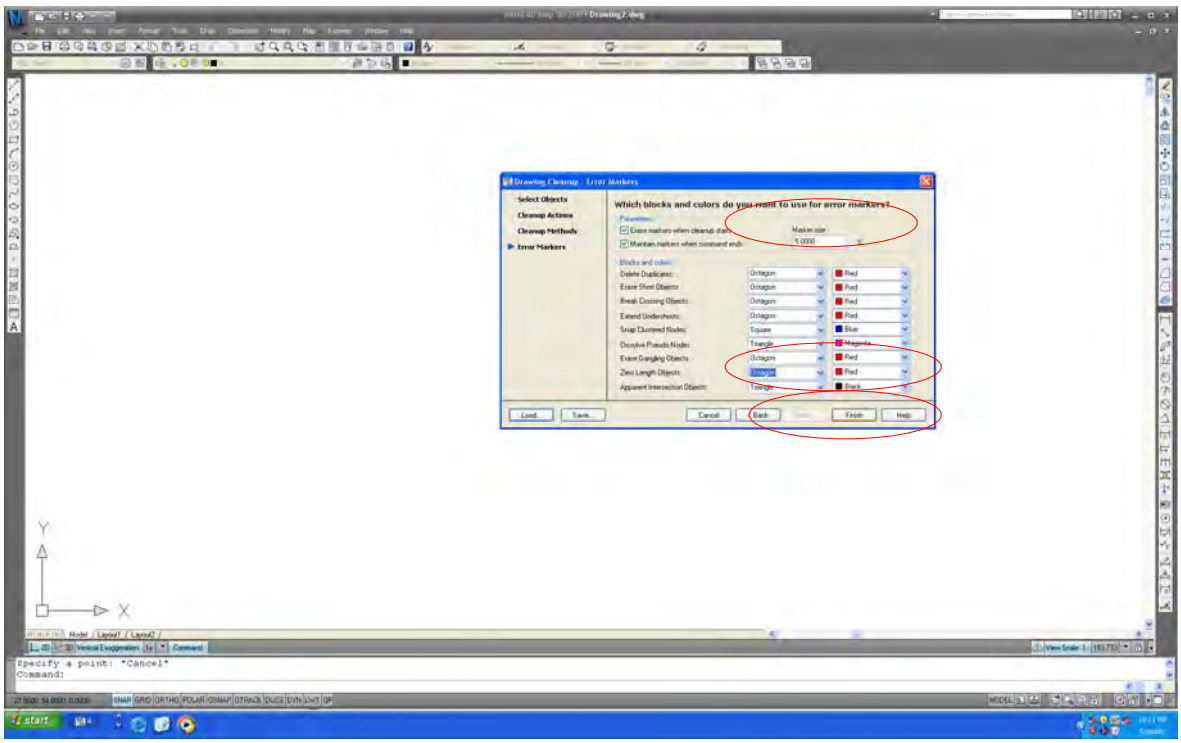
Select “Select all”. Then select “Next”.



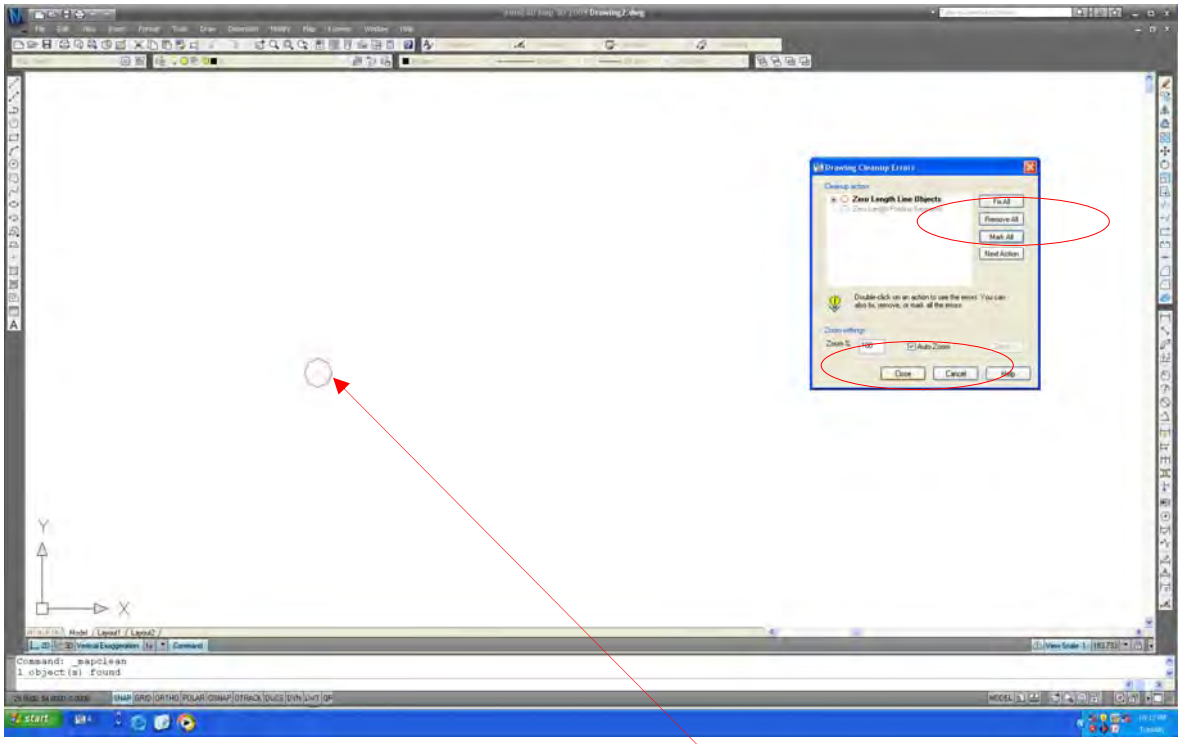
Select “Zero length objects”. Select “Add”. Select “Interactive”. Then, select “Next”.



Select “Modify original objects”. Select “Line to poly-line”. Then, select “Next”.



Set “Marker size”. Set “Marker shape and color”. Then, select “Finish”.

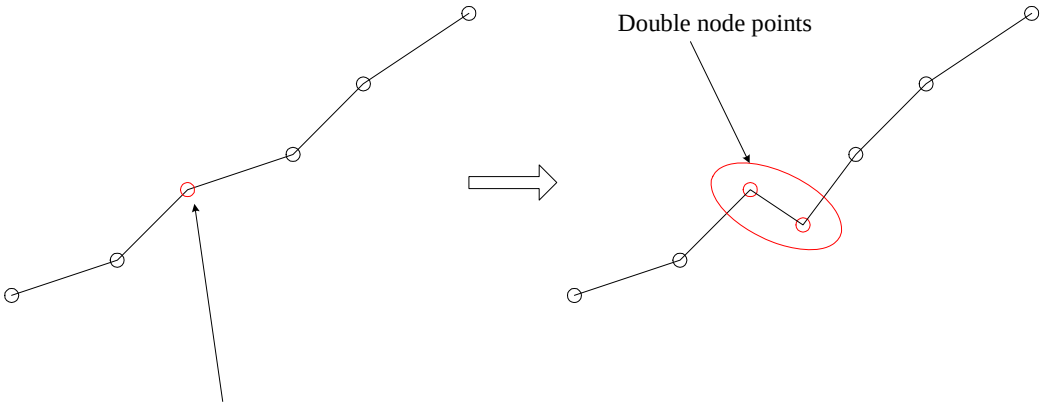


Select “Mark all”. Then, select “Clause”.

Error

6.8. Double Node Points

1) Sample of error



2) How to detect the error

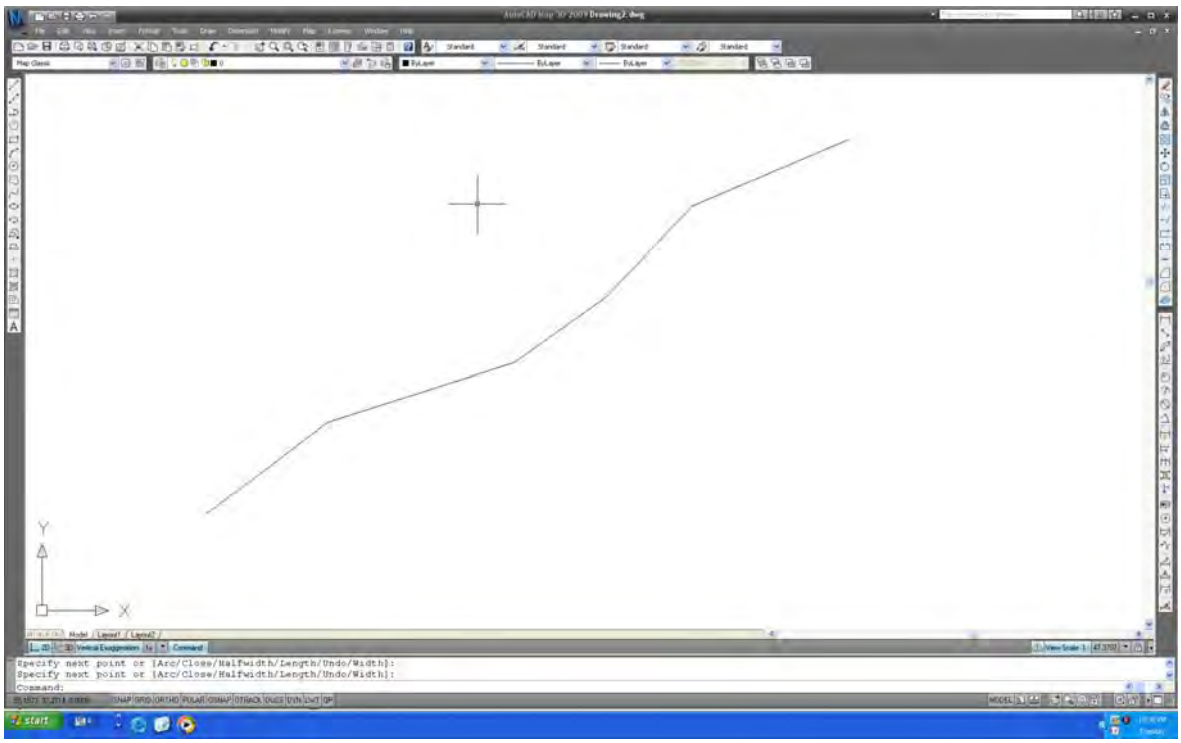
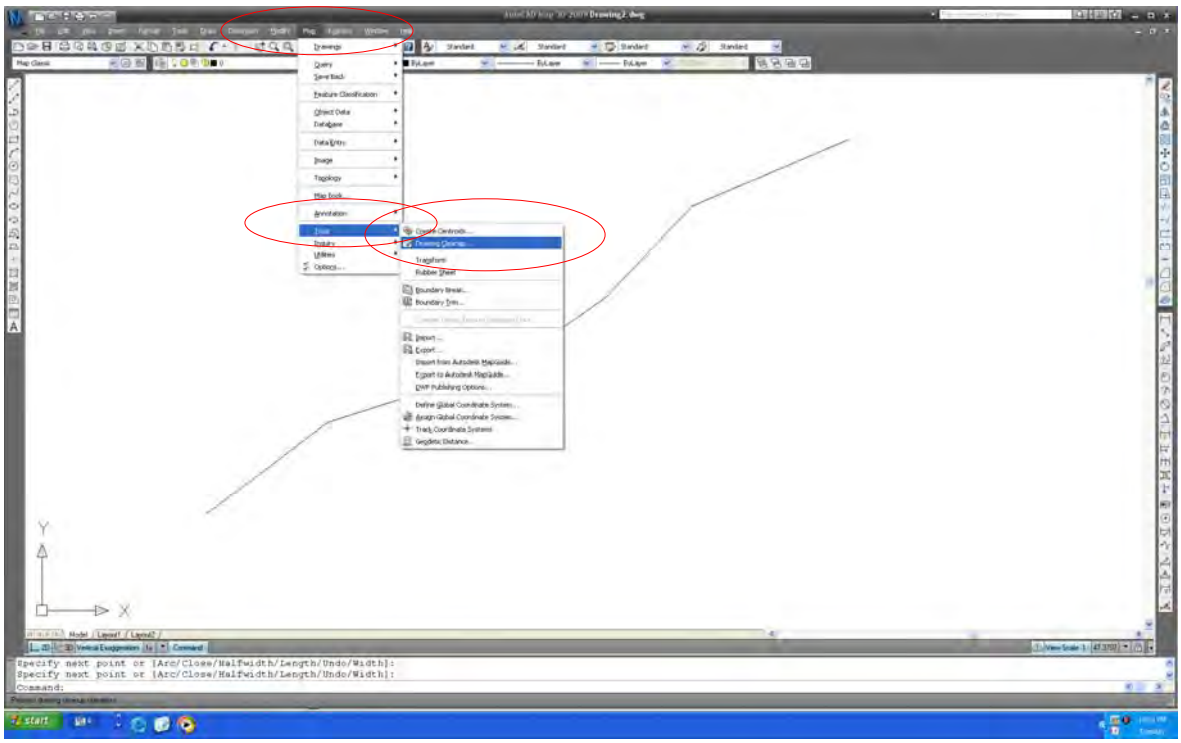
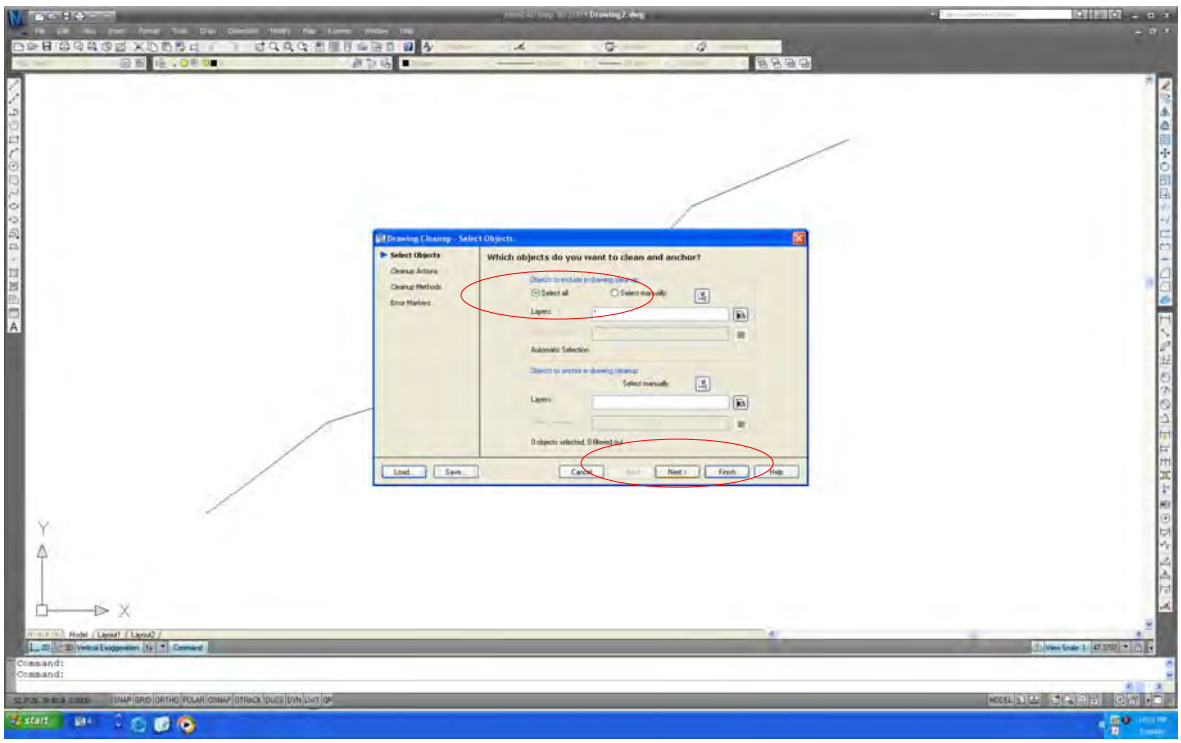


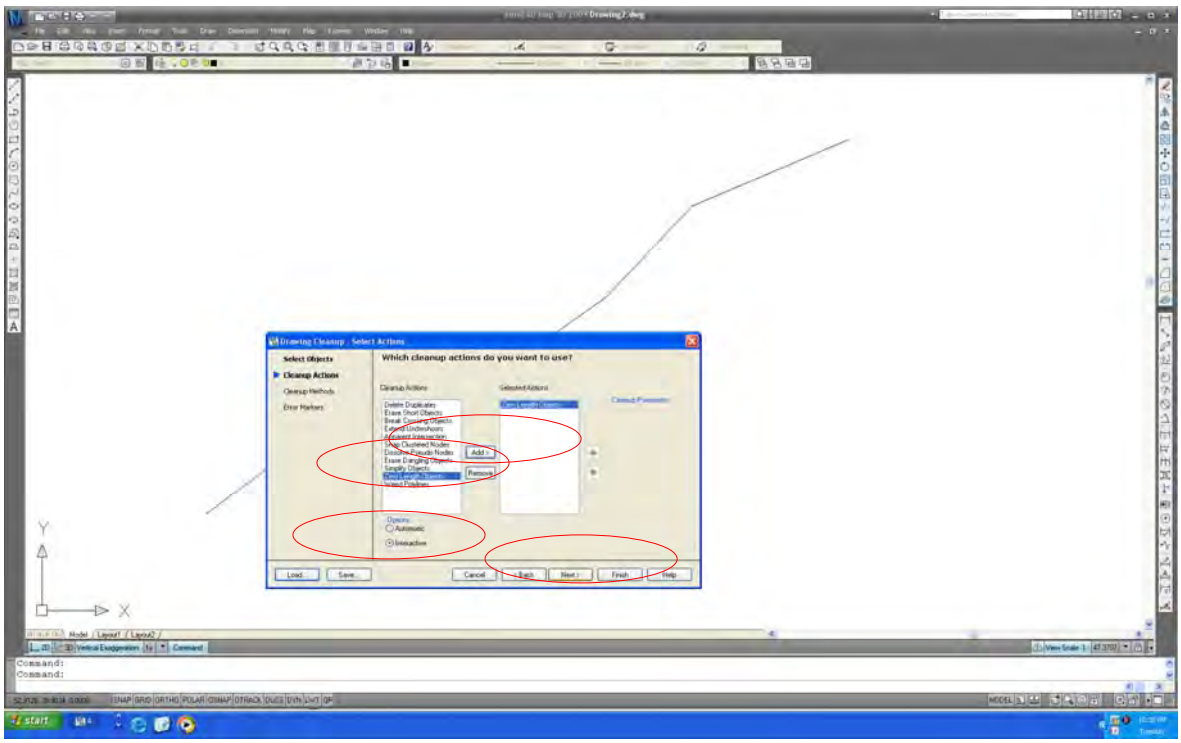
Image on AutoCAD Map3D



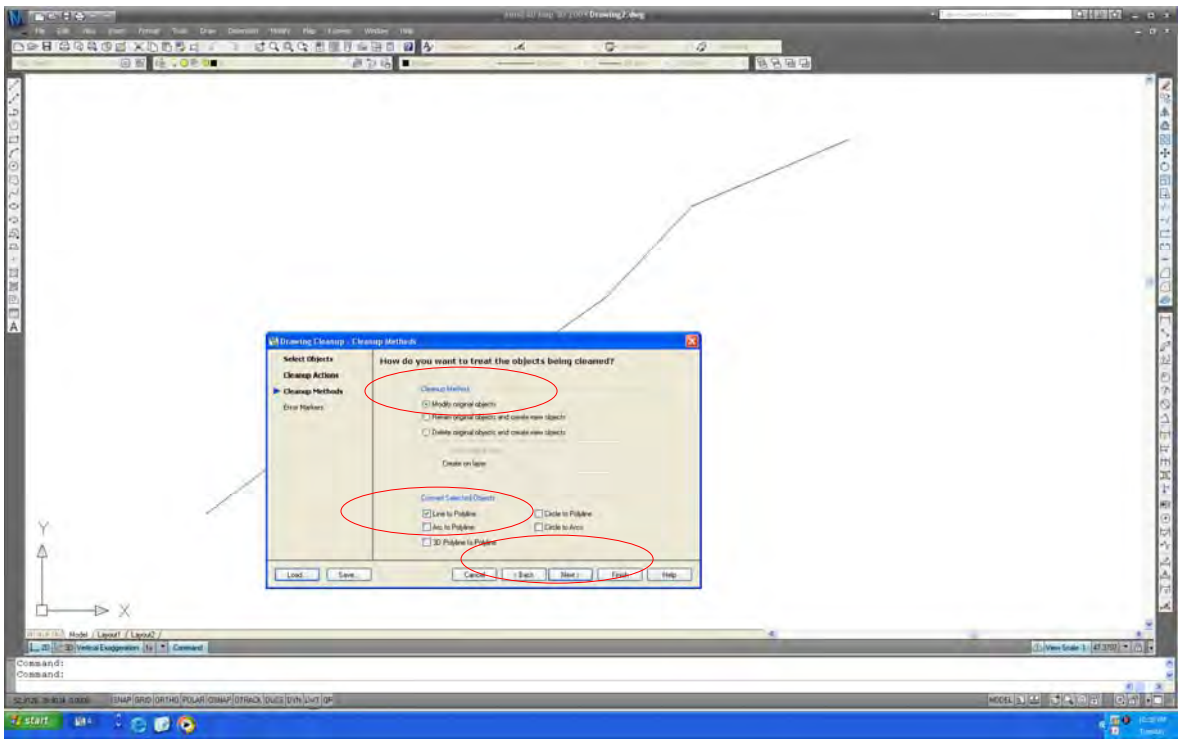
Select “Map”. Select “Tool”. Then, select “Drawing cleanup”.



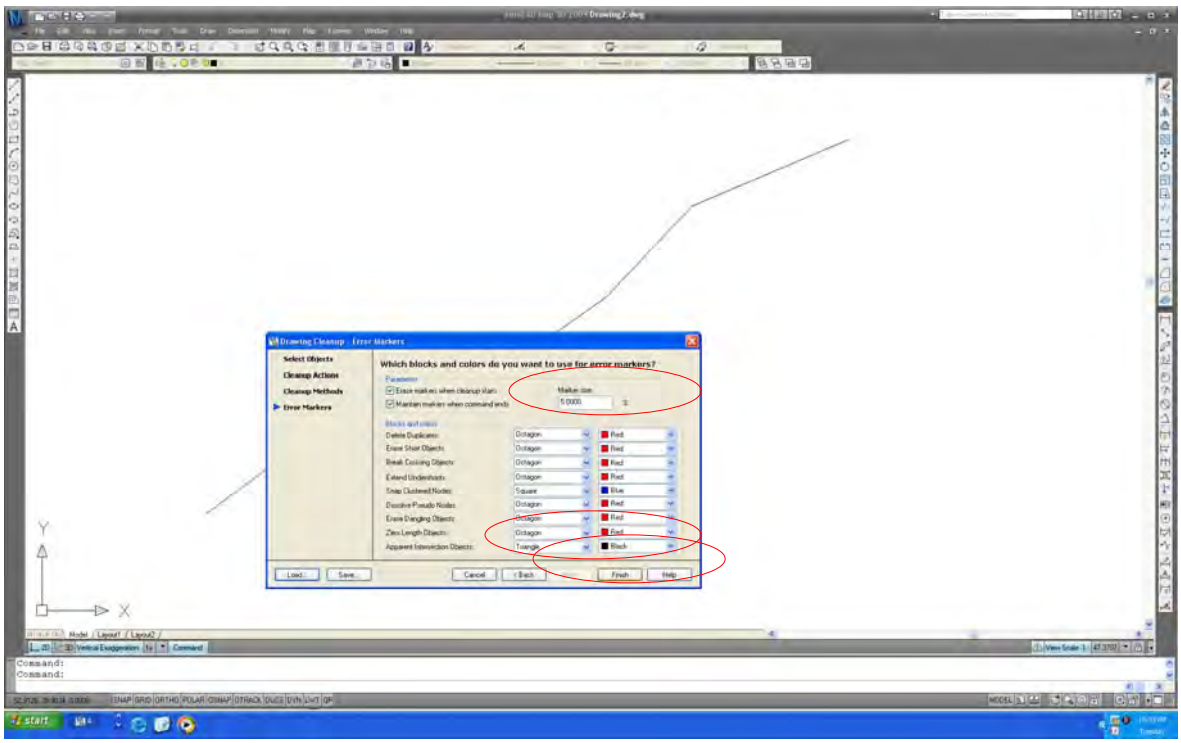
Select “Select all”. Then, select “Next”.



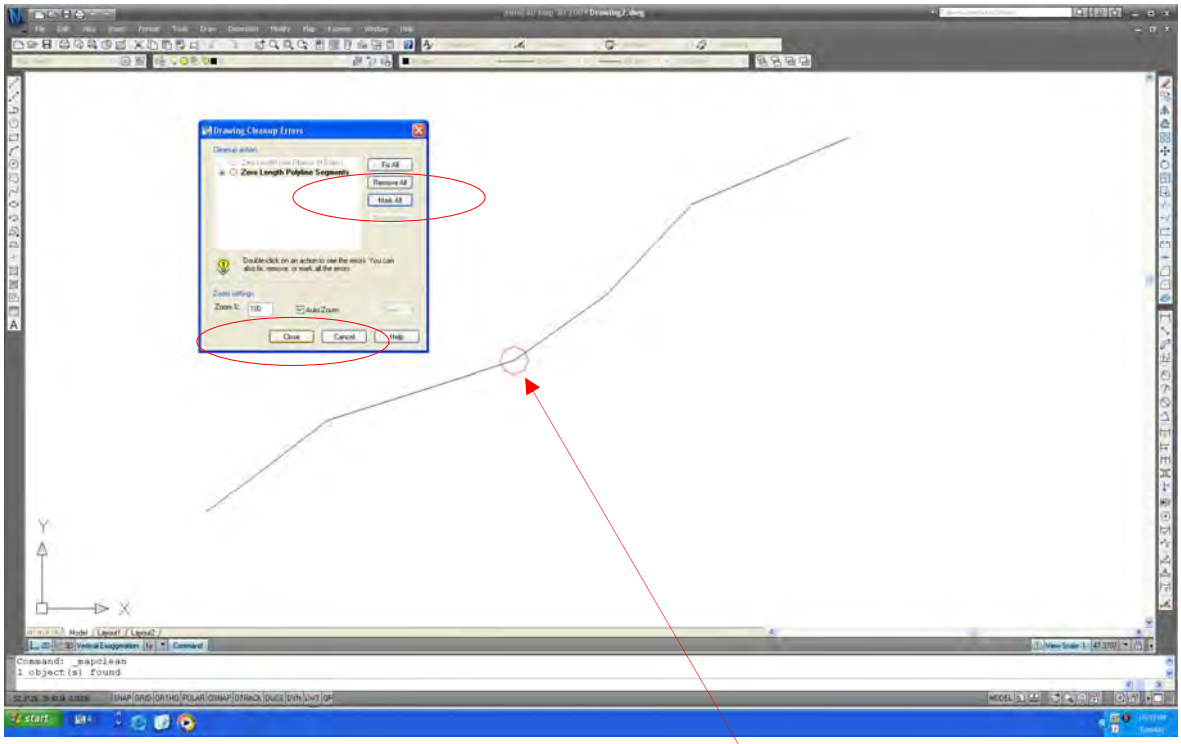
Select “Zero length objects”. Select “Add”. Select “Interactive”. Then, select “Next”.



Select “Modify original objects”. Select “Line to poly-line”. Then, select “Next”.



Set “Marker size”. Set “Marker shape and color”. Then, select “Finish”.

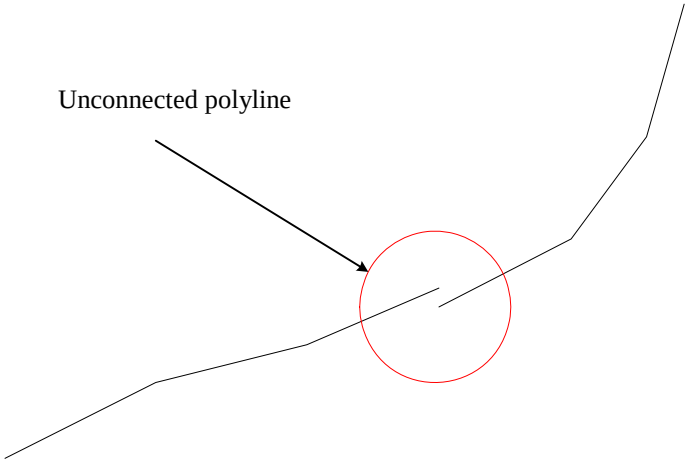


Select “Mark all”. Then, select “Clause”.

Error

6.9. Unconnected Poly-line

1) Sample of error



Attention: This error is very difficult to detect by logical check.

2) How to detect the errors

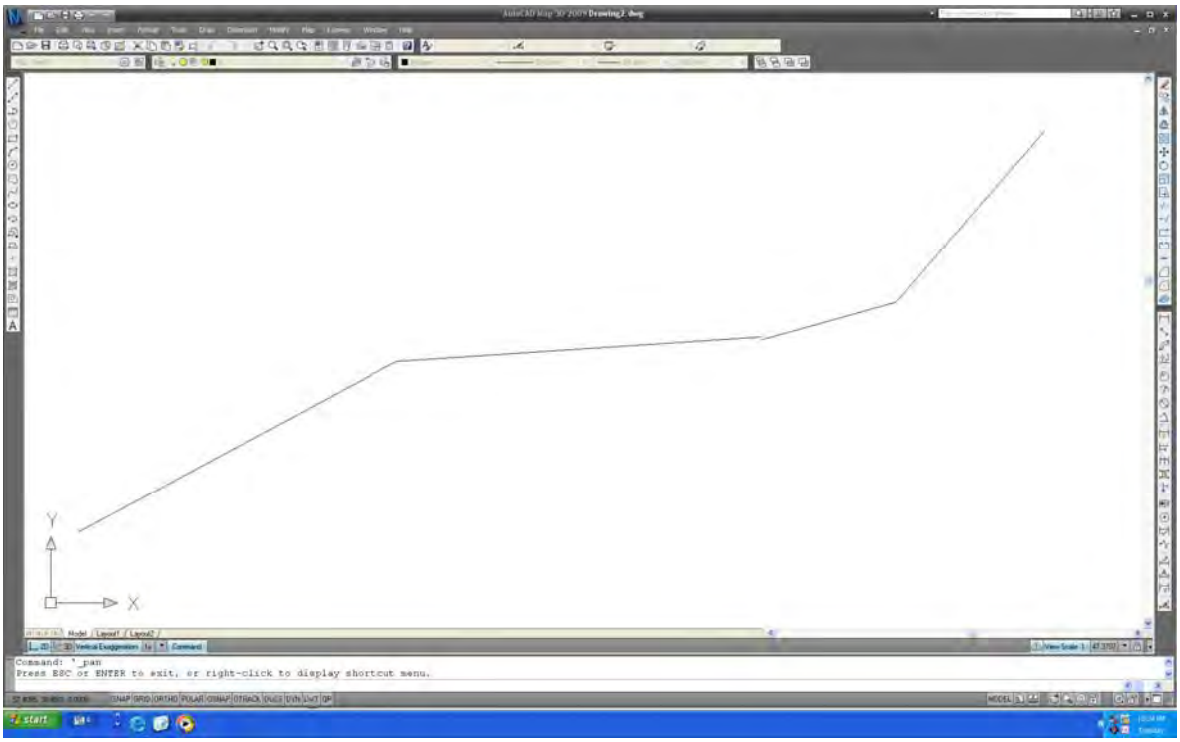
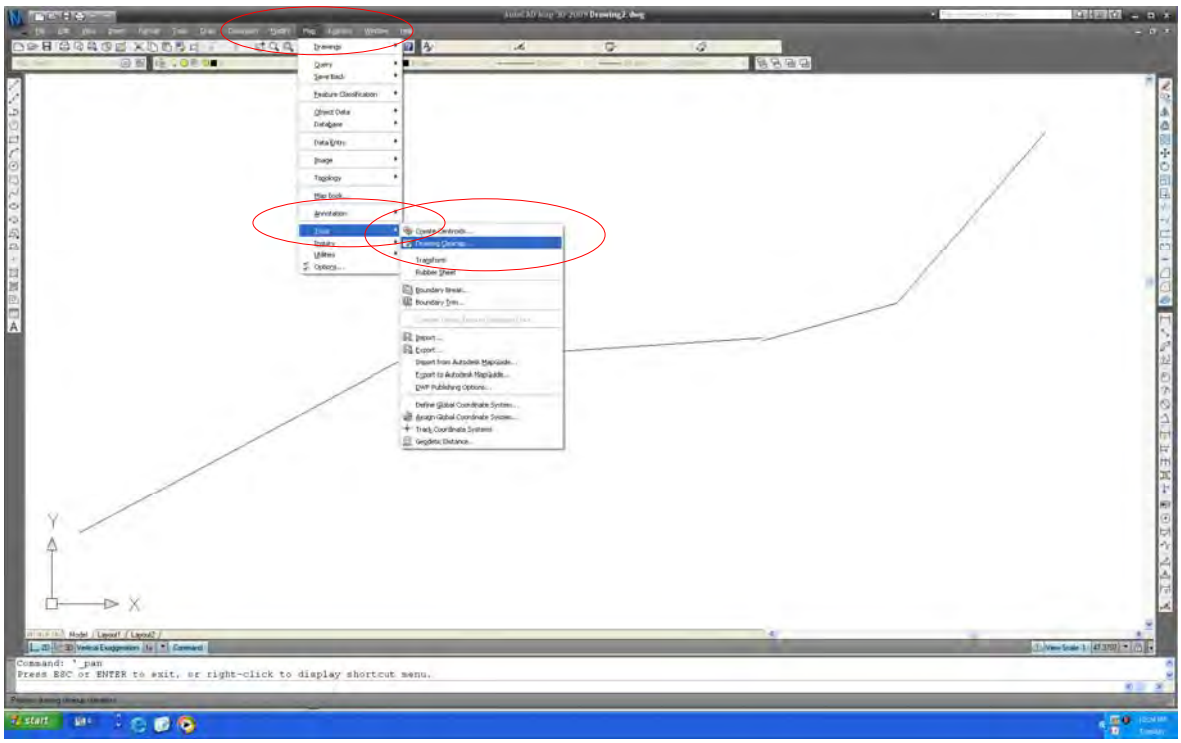
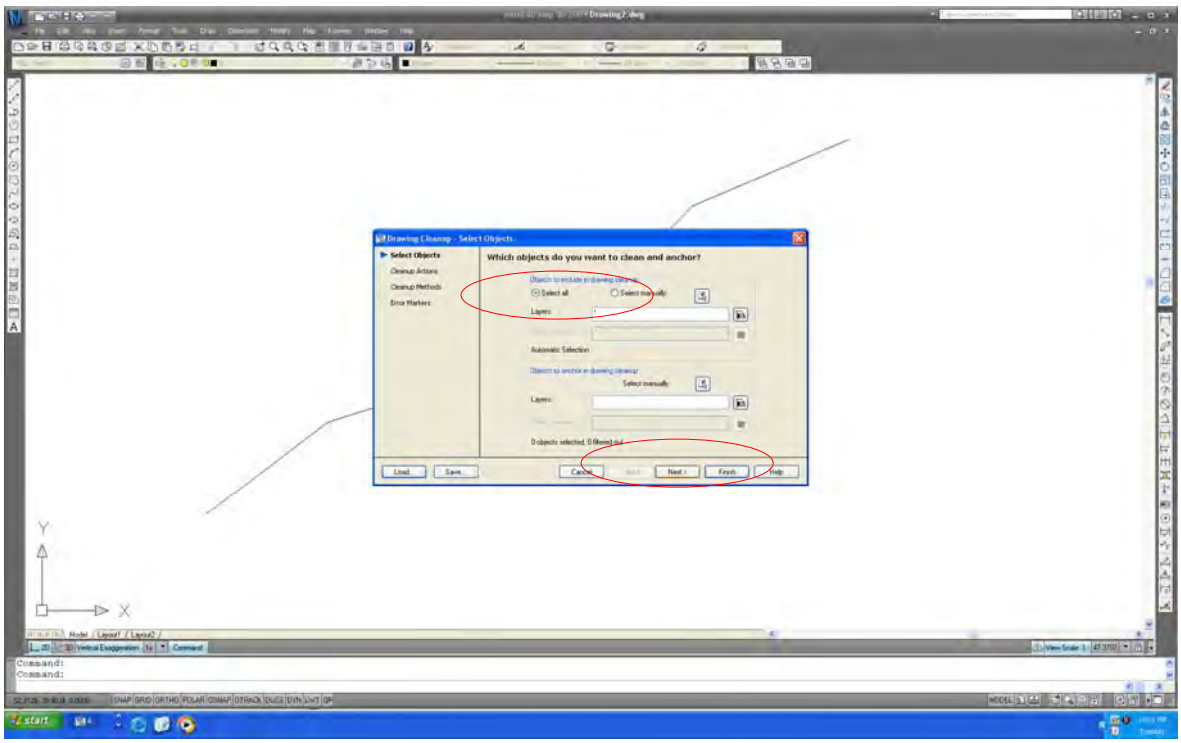


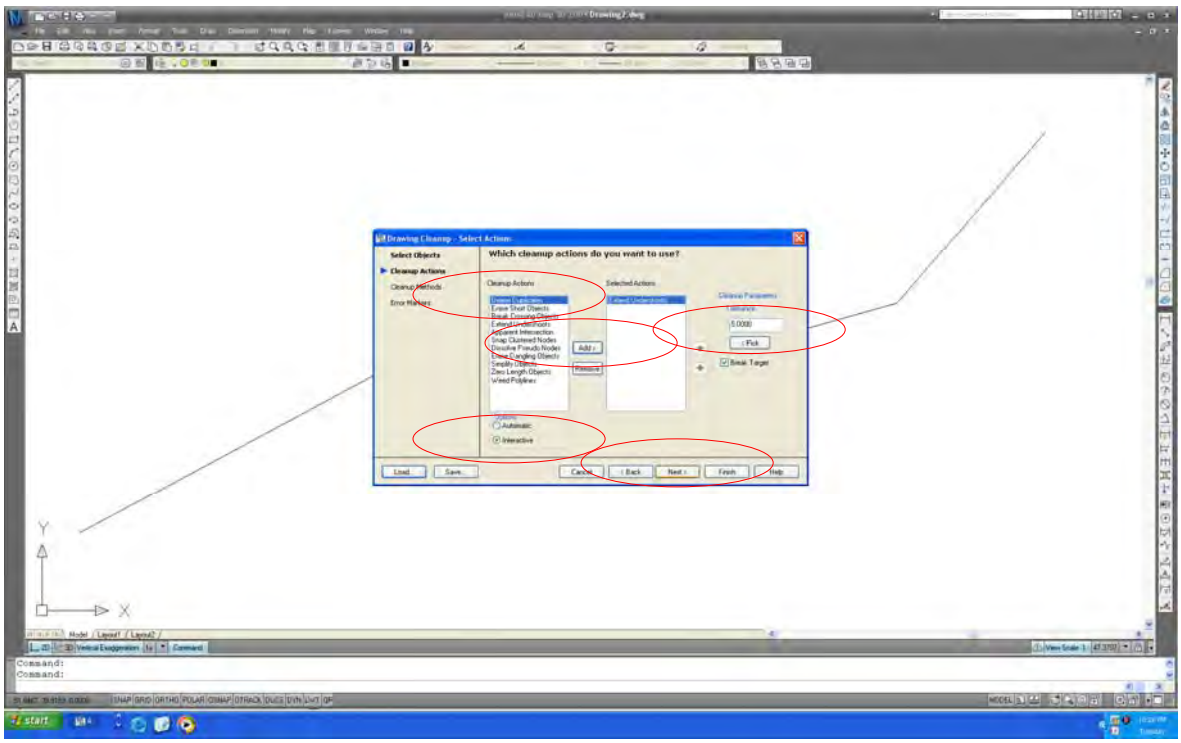
Image on AutoCAD Map3D



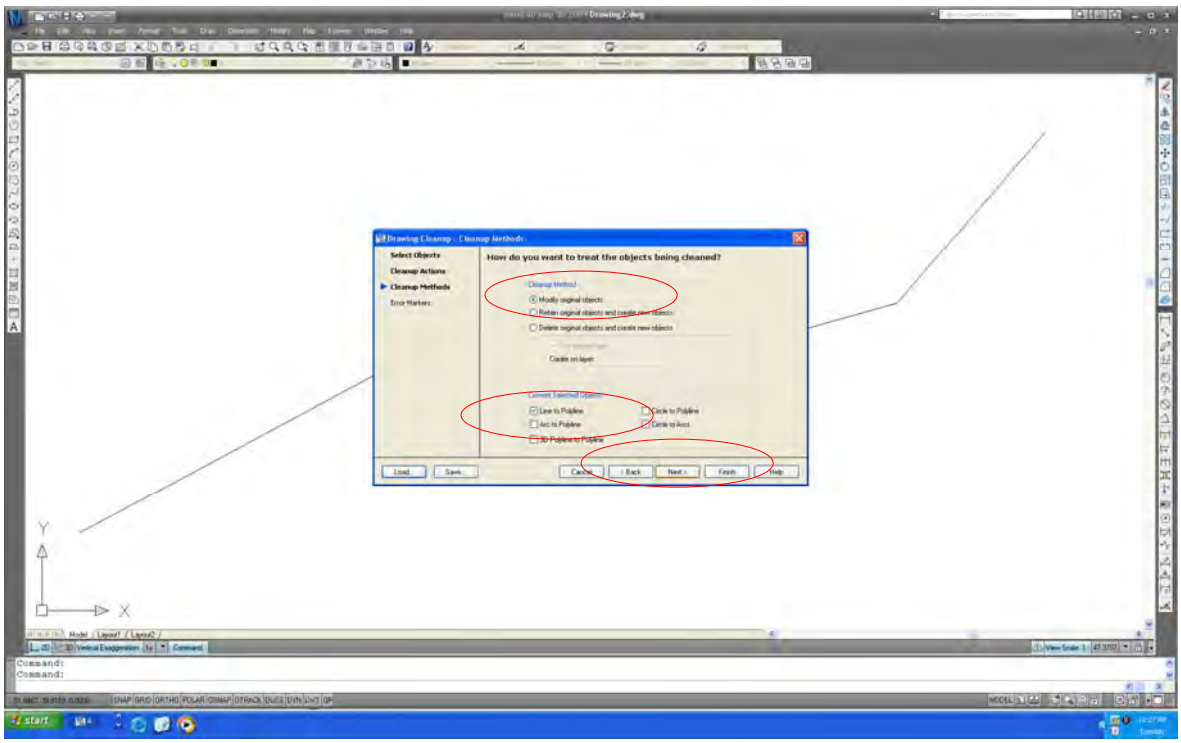
Select “Map”. Select “Tool”. Then, select “Drawing cleanup”.



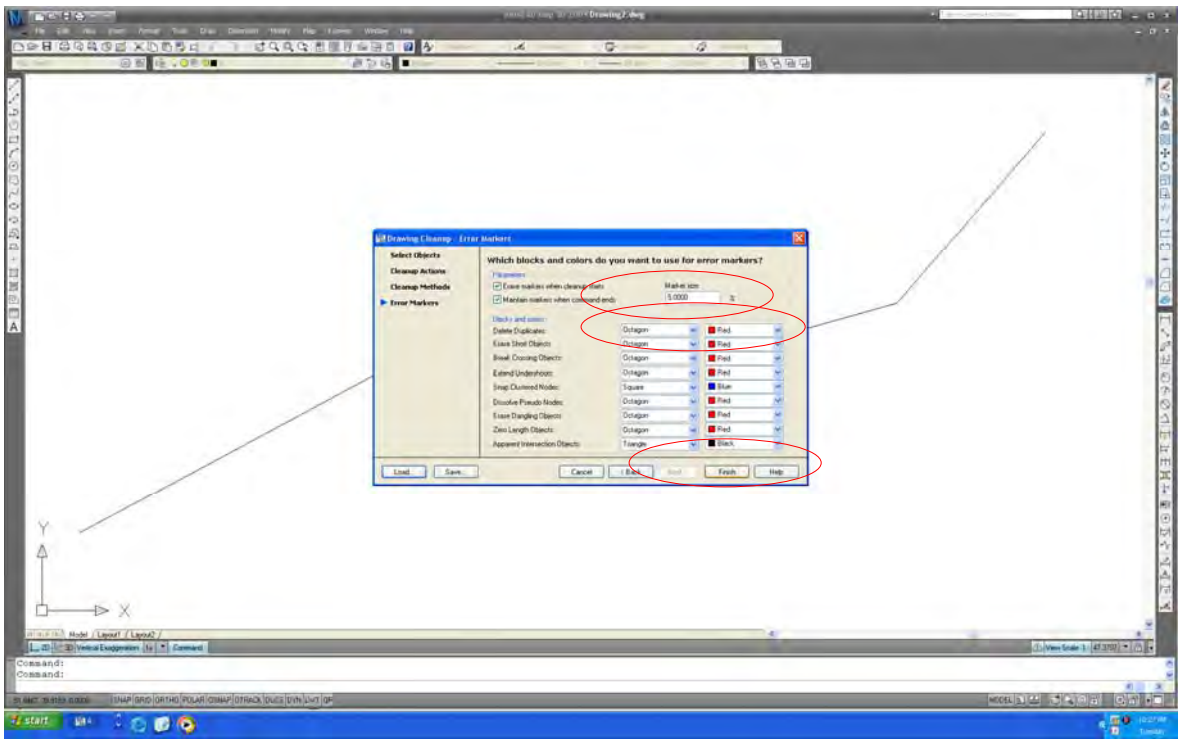
Select “Select all”. Then, select “Next”.



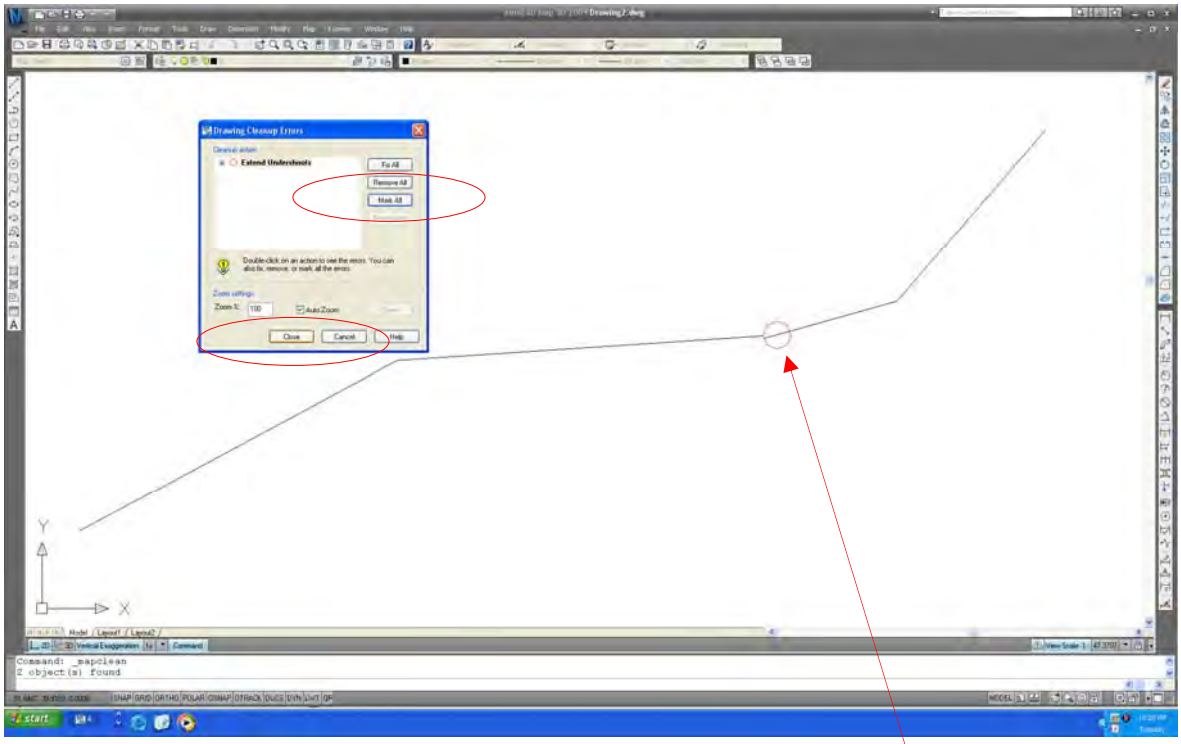
Select “Delete objects”. Select “Add”. Select “Interactive”. Set up “Tolerance”. Then, select “Next”.



Select “Modify original objects”. Select “Line to poly-line”. Then, select “Next”.



Set “Marker size”. Set “Marker shape and color”. Then, select “Finish”.



Select “Mark all”. Then, select “Clause”.

Depending on the value of “Tolerance”, this error can not be detected.

Error

7. Visual check

There are two methods of visual check of digital plotting data as follows:

7.1 Visual check on screen of digital plotting system

The digital plotting data will be shown on the orthophoto image and following check will be executed.

- To check the mistakes of code numbers of digital plotting data
- To check the horizontal position to be obtained is suitable or not.
- To check the lack of data acquisition
- To check the node point at the crossing or connecting point made by two polylines.
- To check the relation between contour lines and spot height values.

7.2 Visual check on the plotted out paper

The digital plotting data with orthophoto image will be plotted out and following check will be executed.

- The items mention on 7.1 will be checked using plotted out digital topographic data with orthophoto image.
- The inspection results will be recorded in the result table of quality evaluation described in 7.3.

・It is checked referred to above 7-1

・The inspection result is recorded in 7-3(RQE).

7.3 Result table of the quality evaluation (RQE)

No.	Main-items	Sub-item	Check point			
			Code.	Extra data	Lack data	Other
1	Road	Metal road	RD101			
		Un-metal road	RD102			
		Brick road	RD103			
		Cart track	RD104			
2	Railway	Railway line	RL201			
3	River	Double line river	HF301			
		Single line river	HF302			
		Coastline	HF303			
4	Lake/Pond	Lake	HF401			
		Tank/Pond	HF402			
5	Bridges	Bridges	RD501			
		Culvert	RD502			
6	House	Normal house	PT601			
		Building (3m>)	PT602			
		Station house	PT603			
		Airport house	PT604			
7	Fence	Wall	PT305			
		Fence	PT306			
8	Vegetation	Vegetation boundary	HF701			
		Area boundary	HF702			
		Vegetation symbol	HF703			
		Un-vegetation symbol	HF704			
9	Embankment	Embankment（Over 3.0m）	HF801			
		Embankment（Below 3.0m）	HF802			
10	Power transmission	Line	PT901			
		Tower (Big)	PT902			
		Tower (Small)	PT903			
11	Spot height	Spot height	RF1001			
12	Contour	Contour line (10m)	RF1102			
		Index contour line (50m)	RF1103			
		intermediate contour line (5m)	RF1104			