ANNEX IV

ERDAS IMAGINE OPERATION MANUAL

Table of Contents

Figures

1. TOPIC 1 DATA IMPORT

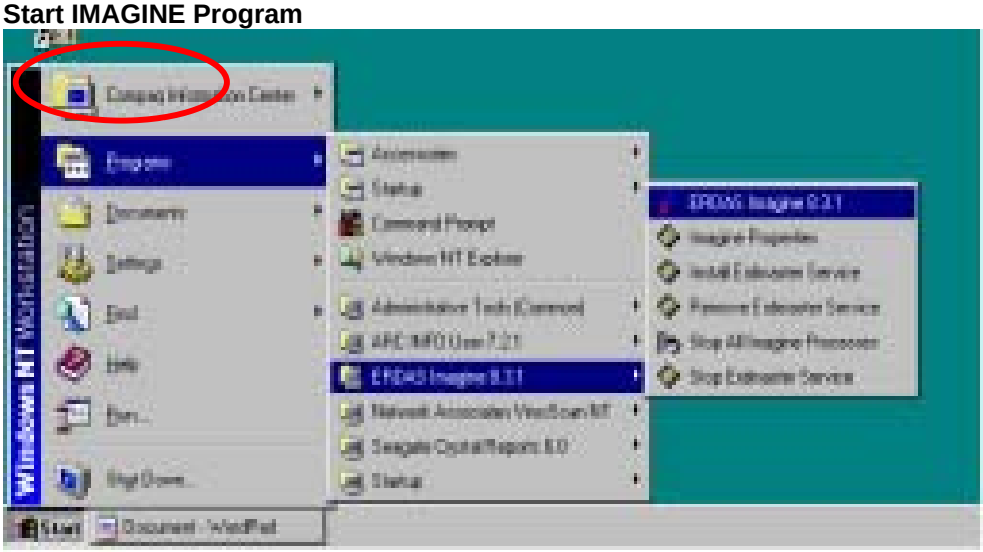
Importing SPOT Phase I data from CDROM into Imagine file (*.img) by using IMAGINE 8.3.1 software

1.1. Importing SPOT DATA directly from CDROM

1 Insert CD into CDROM

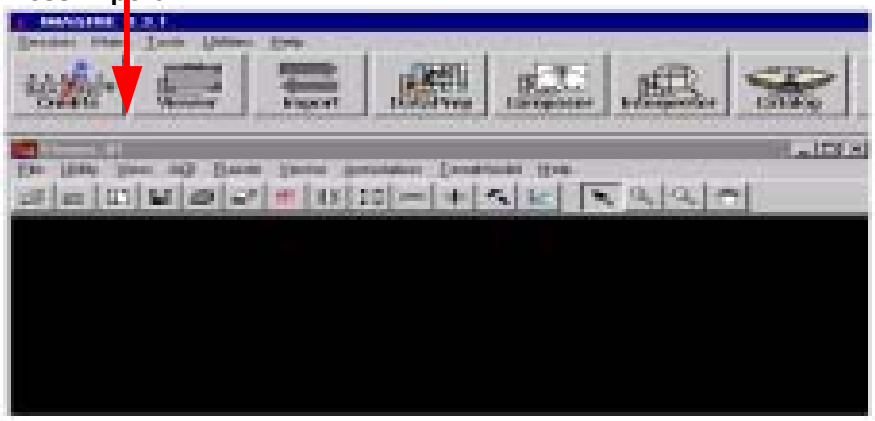
2 Start IMAGINE program

Figure 1-1 Start IMAGINE Program



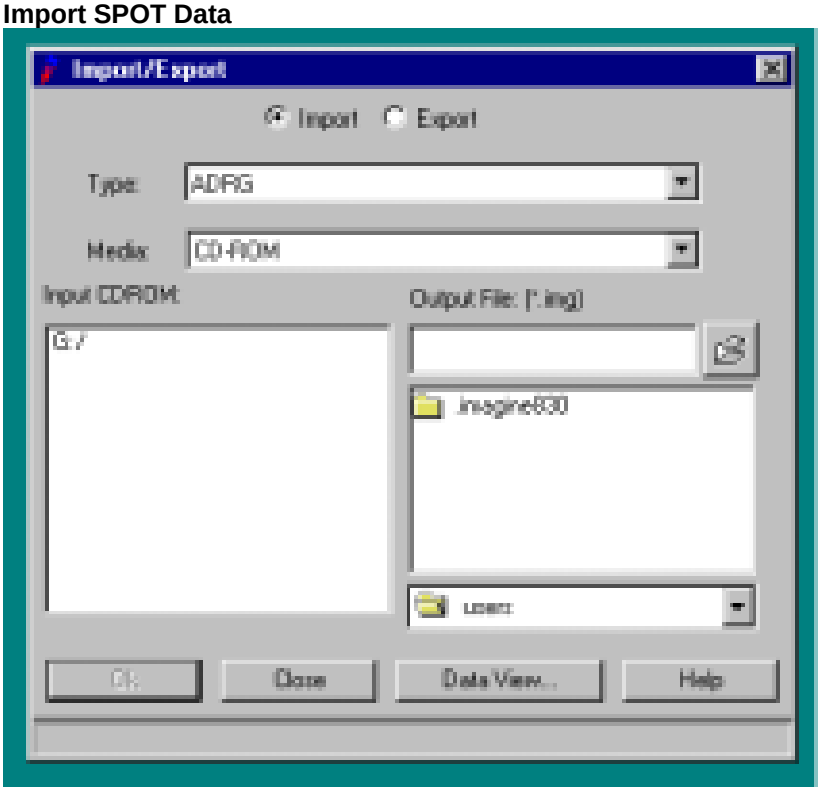
3 Press IMPORT icon

Figure 1-2 Press Import



The import message box appear

Figure 1-3 **Import SPOT Data**



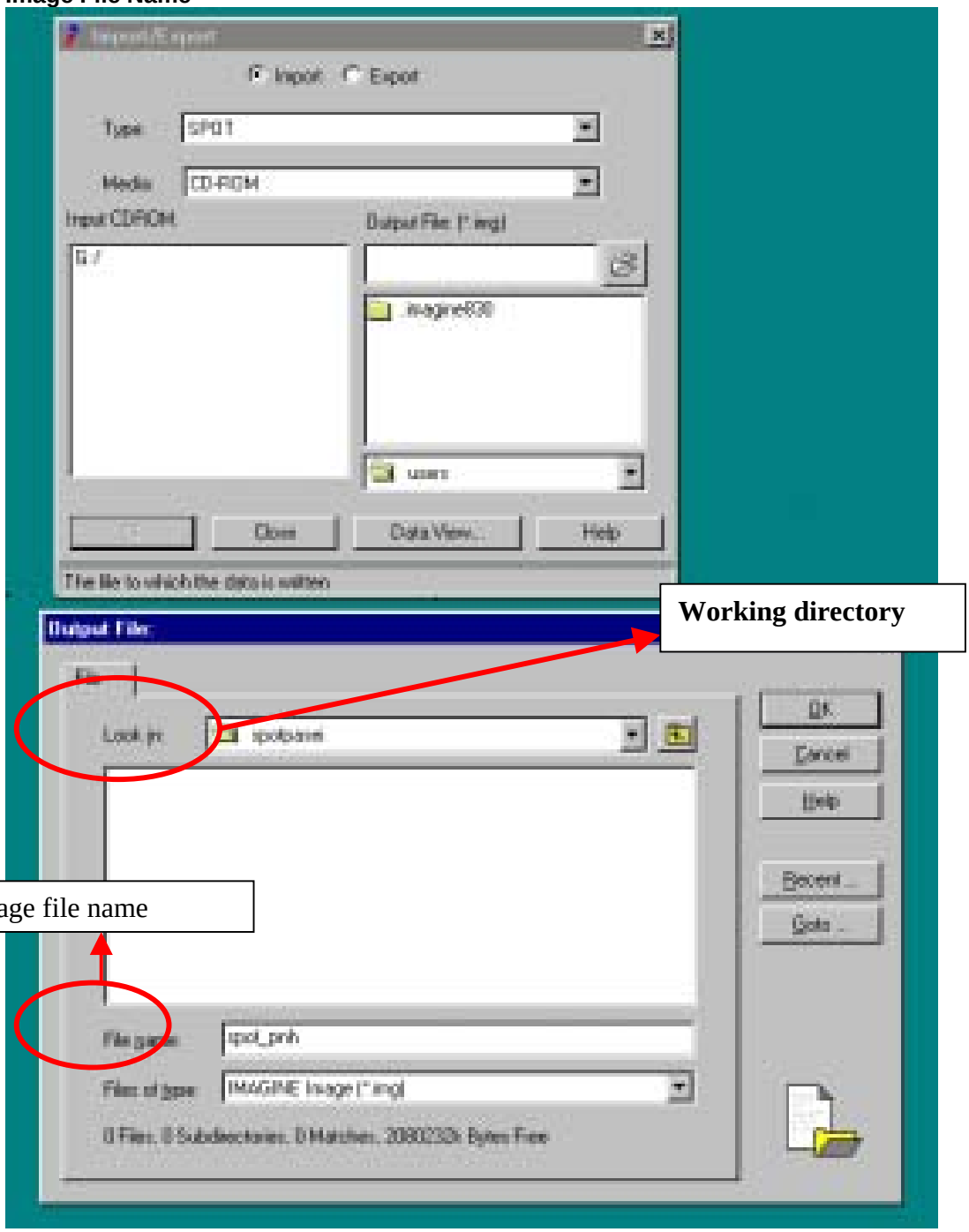
*4 Then change the type form **ADRG** to **SPOT** by click on*

Figure 1-4 **Select SPOT**

5 *Click open button*  *of Output File: (.img) to put the image file name into the working directory*

6 *Then Click* ***OK***

Figure 1-5 Image File Name



7 *Then click* ***OK.***

The **import BOX** will appear again and click **G:** then click **OK**

Figure 1-6 **Import Export Box**

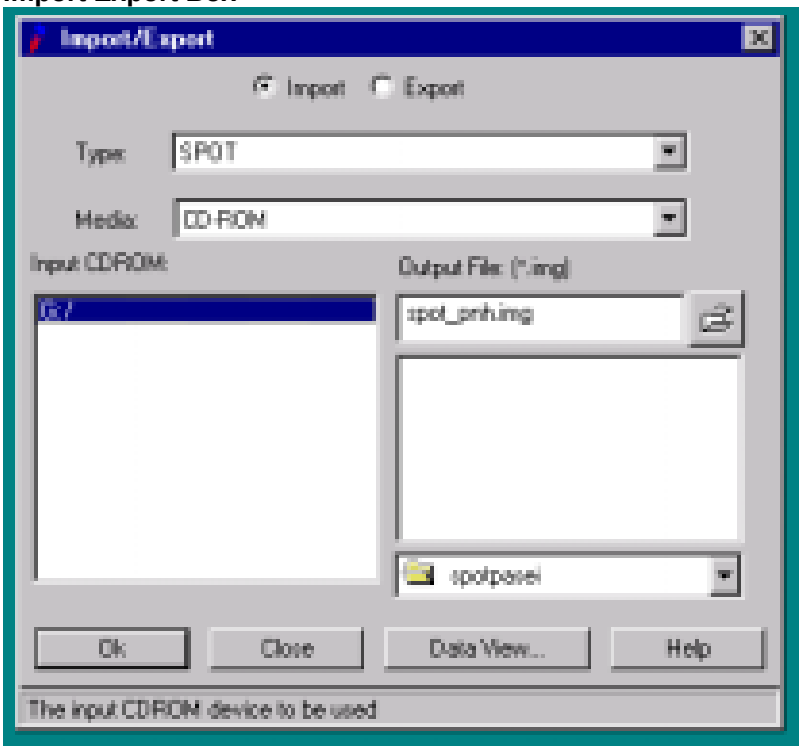
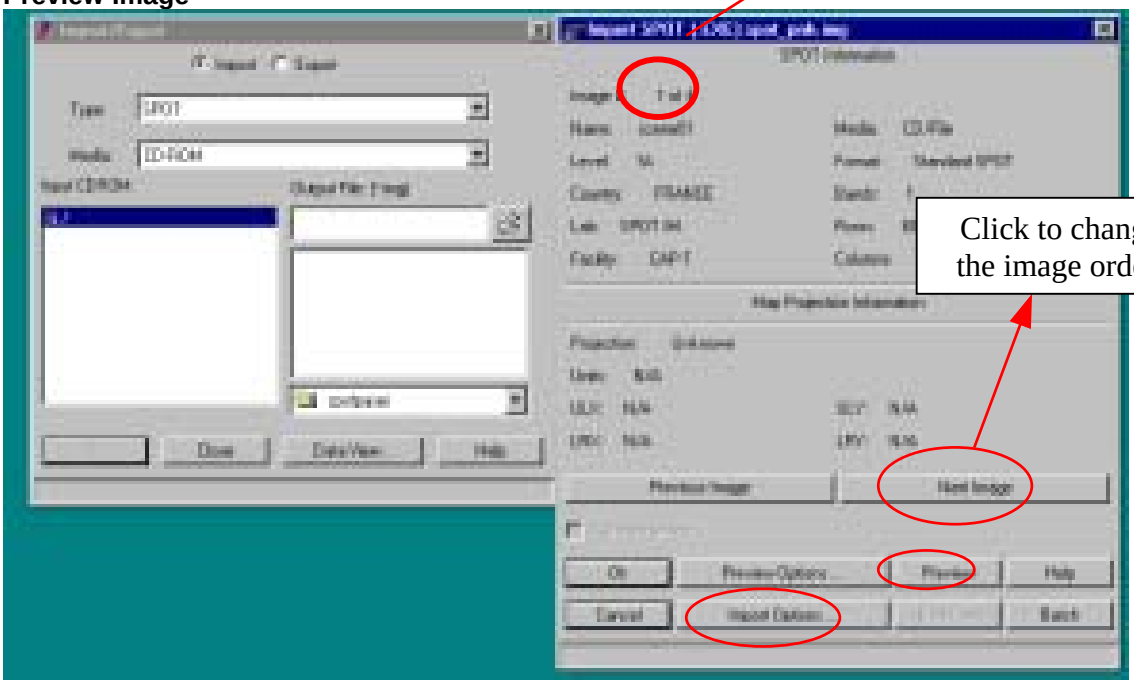


Figure 1-7 **Preview Image**

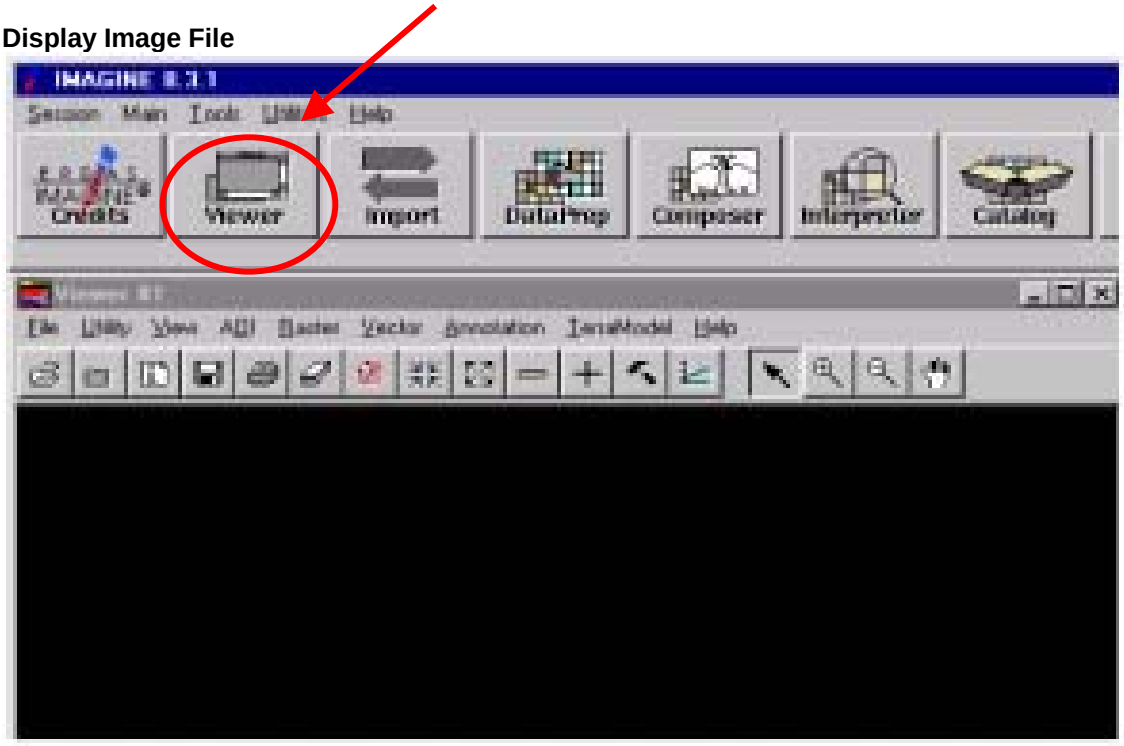


Click the **Preview** if you want to see how the image looks like. For the **Import Option** do not change it.

Click **OK** to let the import process to run. After finishing **100%, close the importing window.**

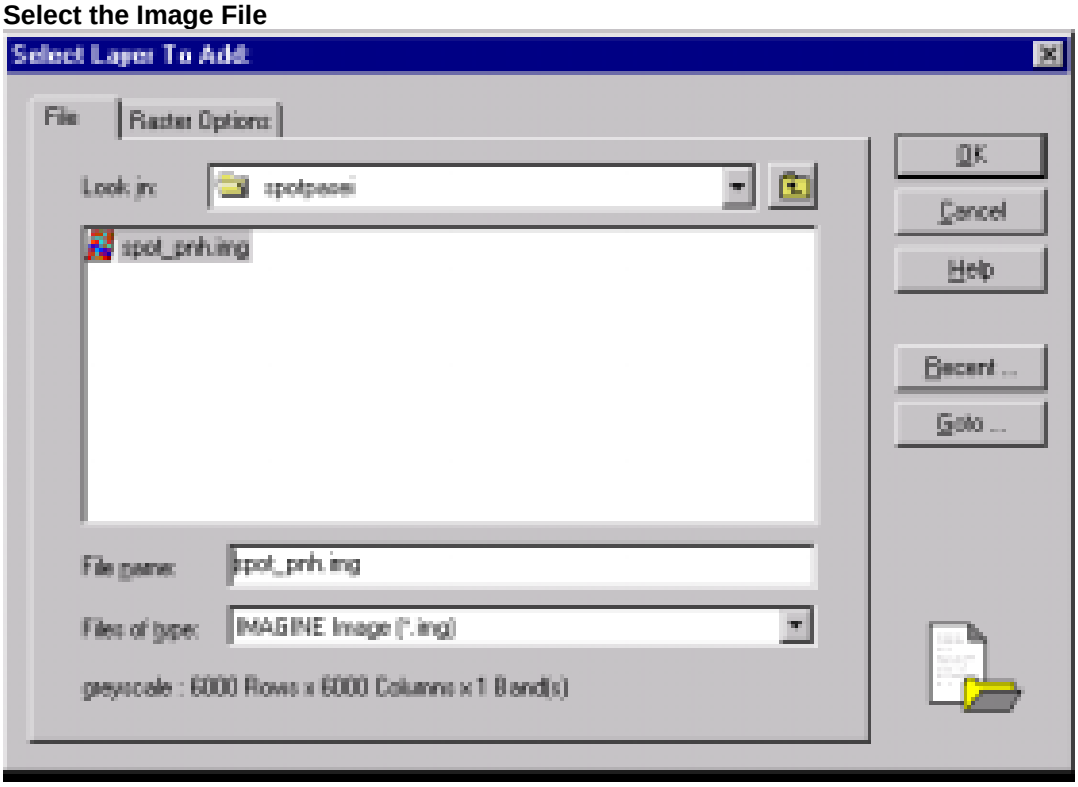
To display the image file, click **VIEWER** button.

Figure 1-8 **Display Image File**



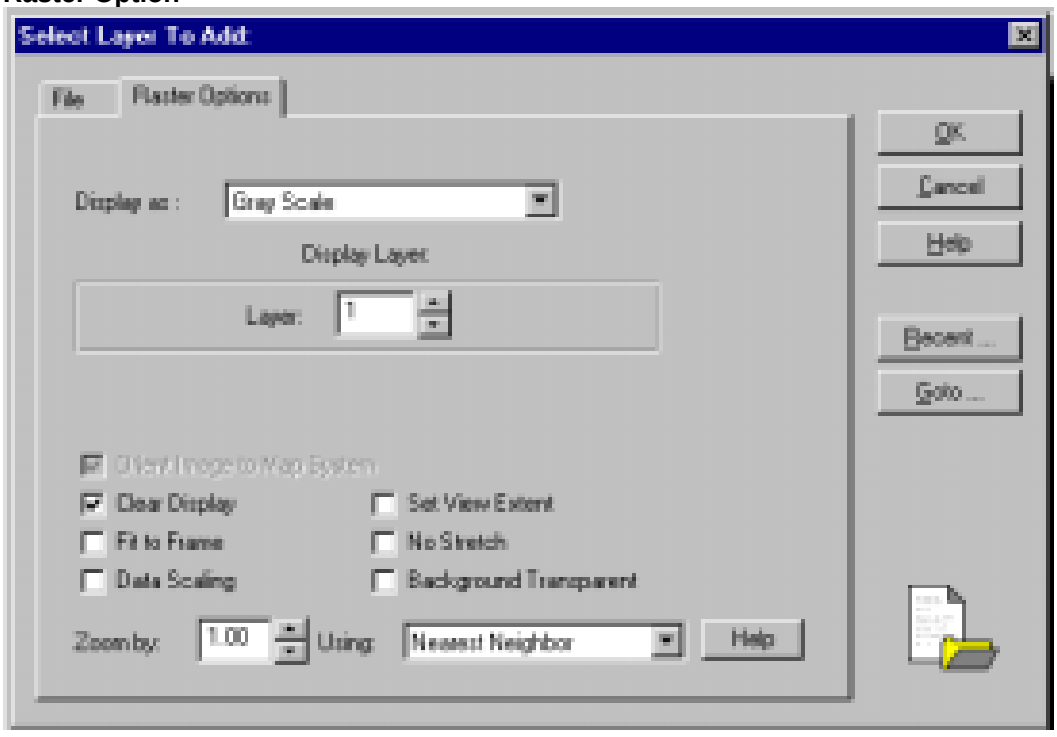
Change to the working directory and **select** the image file.

Figure 1-9 **Select the Image File**



Change the raster Option by tick the following parameters in the below box then click **OK**

Figure 1-10 **Raster Option**



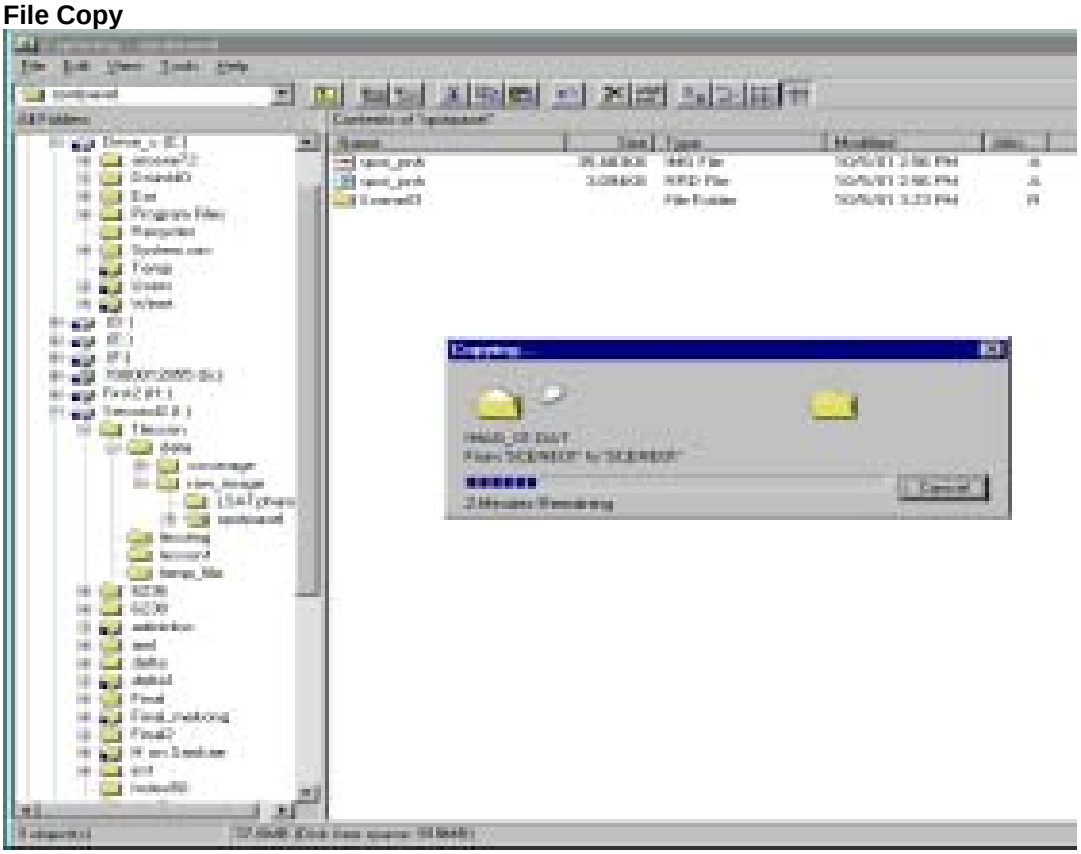
The image will be displayed like this.

Figure 1-11 Image Sample

1.2. Importing SPOT (Panchromatic) using GENERIC BINARY

1 copy file from CD into the working data using ***windows explorer***

Figure 1-12 File Copy



Then **Open** the **IMAGINE** programme (see Start IMAGINE programme)

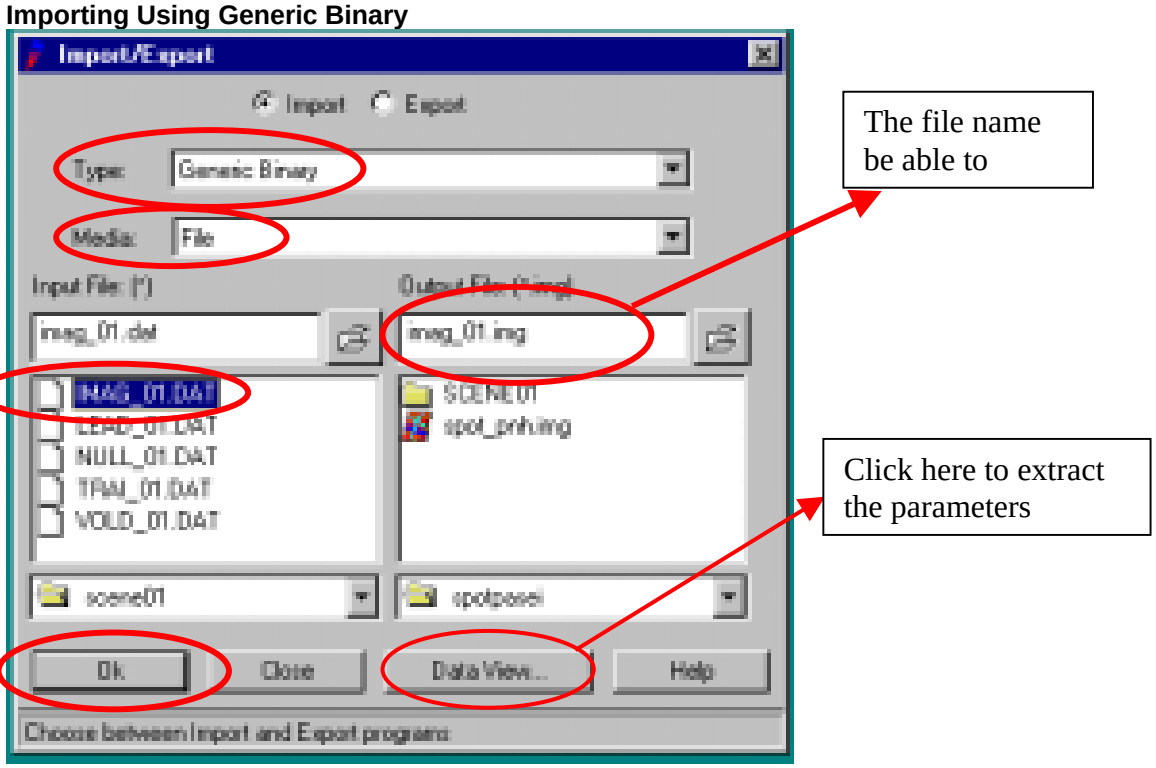
Click the **Import** button, the Import box will appear

In the box, **Type** must be changed to **Generic Binary**

The **Media** also changed to **File** then **select** the **IMAG_01.DAT**

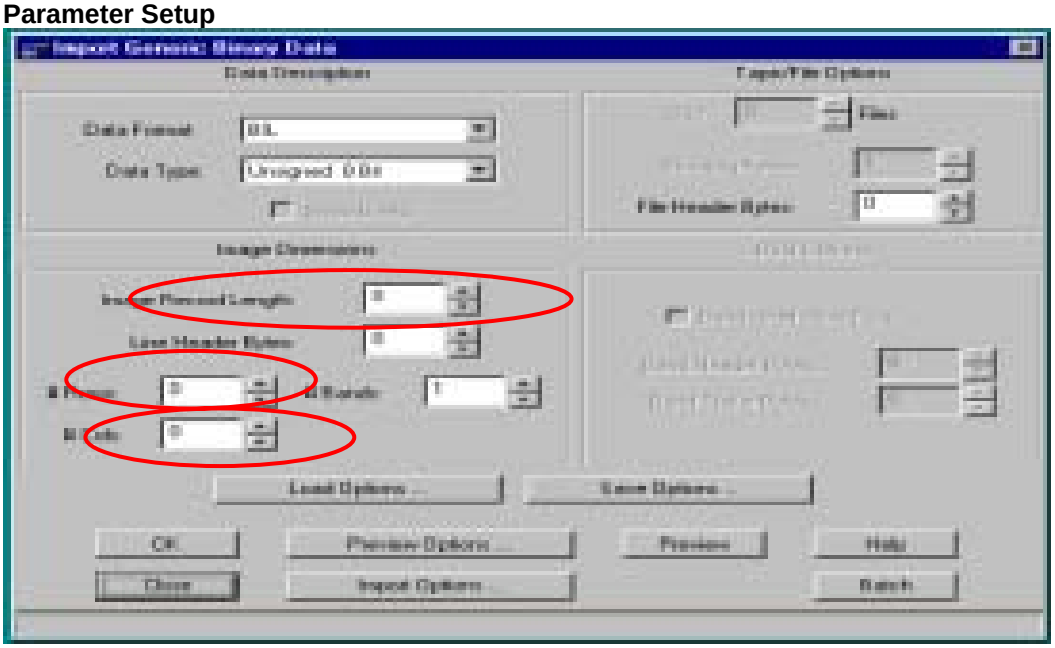
then Click OK

Figure 1-13 **Importing Using Generic Binary**



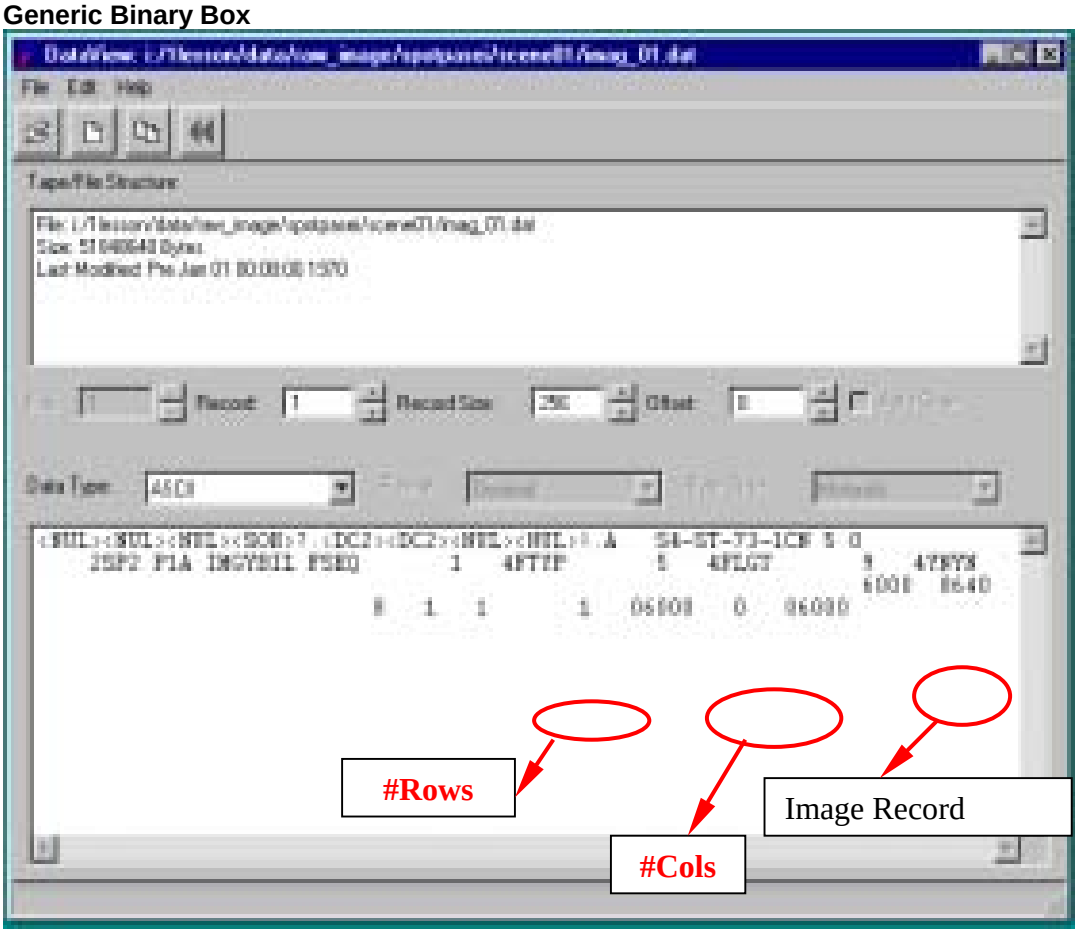
Then the **Generic Binary box** will display for changing **PARAMETERS**

Figure 1-14 **Parameter Setup**



The red cycles are the parameters needed to be changed. The **PARAMETERS** should be extracted from **Data View.** For information about Data format and Data Type (Annex 1)

Figure 1-15 Generic Binary Box

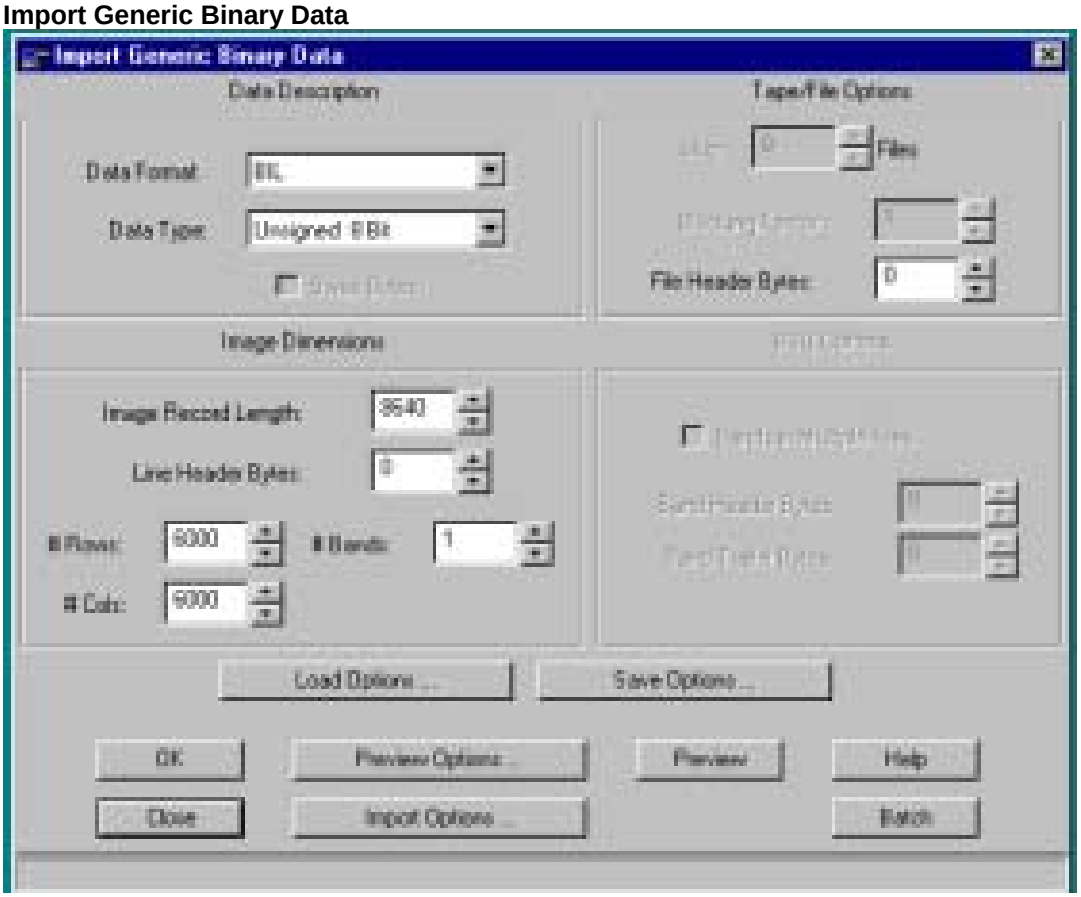


After changing the **PARAMETERS,** the **Generic Binary box** will be showed as below.

Click the **Preview**, If you want to see how the image is look like. No need to change the **Import Options.., and others,** Keep as default!!!!!!.

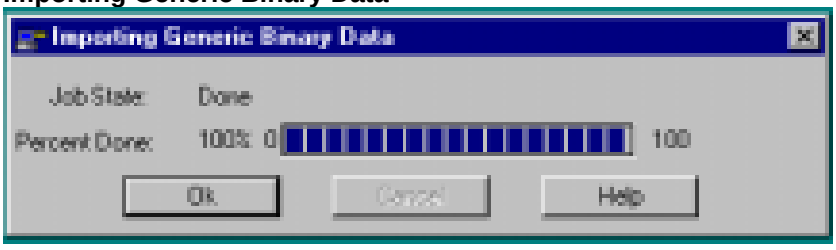
THEN Click **OK**

Figure 1-16 Import Generic Binary Data



Click **OK** to let the processing finished in **100%.** And, after completing the process to 10%, close the importing window.

Figure 1-17 Importing Generic Binary Data



To DISPLAY the image file, follow the same procedure as in section **(I)** importing SPOT **data** from CD.

Figure 1-18 Viewing SPOT Image

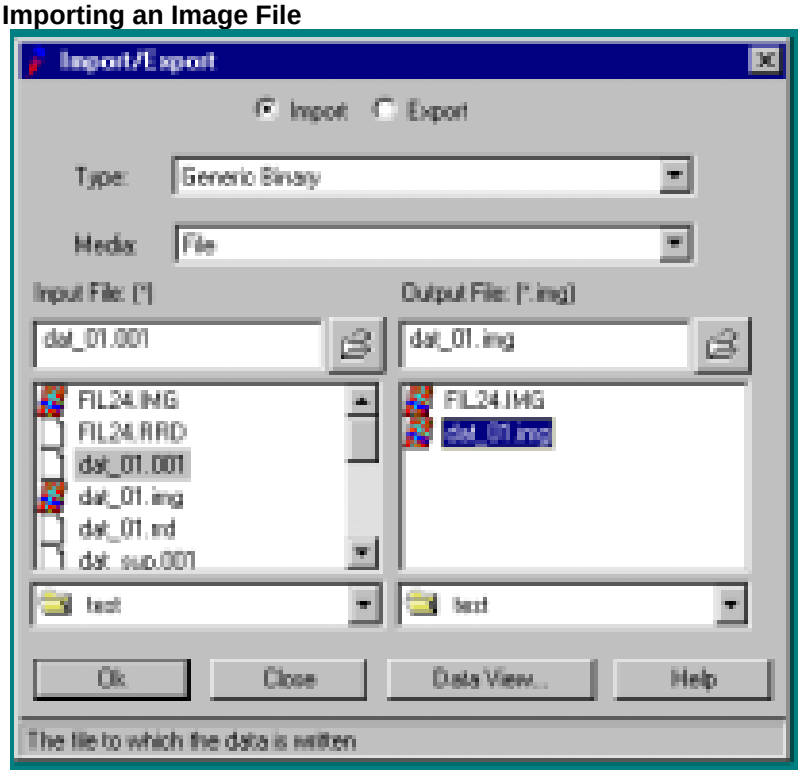
1.3. Importing LANDSAT DATA

1 *Copy data from **CD** into **Working directory***

2 *Start **IMAGINE** program*

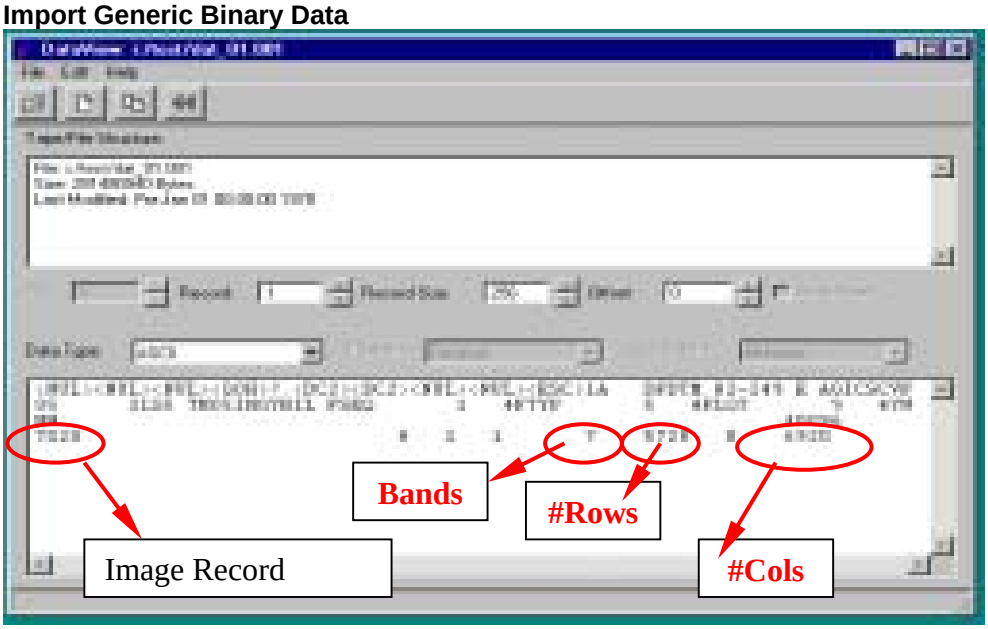
3 *Click **Import** button, then in the **Import box** change the **TYPE:** to **Generic Binary** and **Media** to **File.** Then select the file name **(dat_01.001)** of the **Input File** and in the **Output File** change to the working directory and type the output file name (**dat_01.img).***

Figure 1-19 Importing an Image File



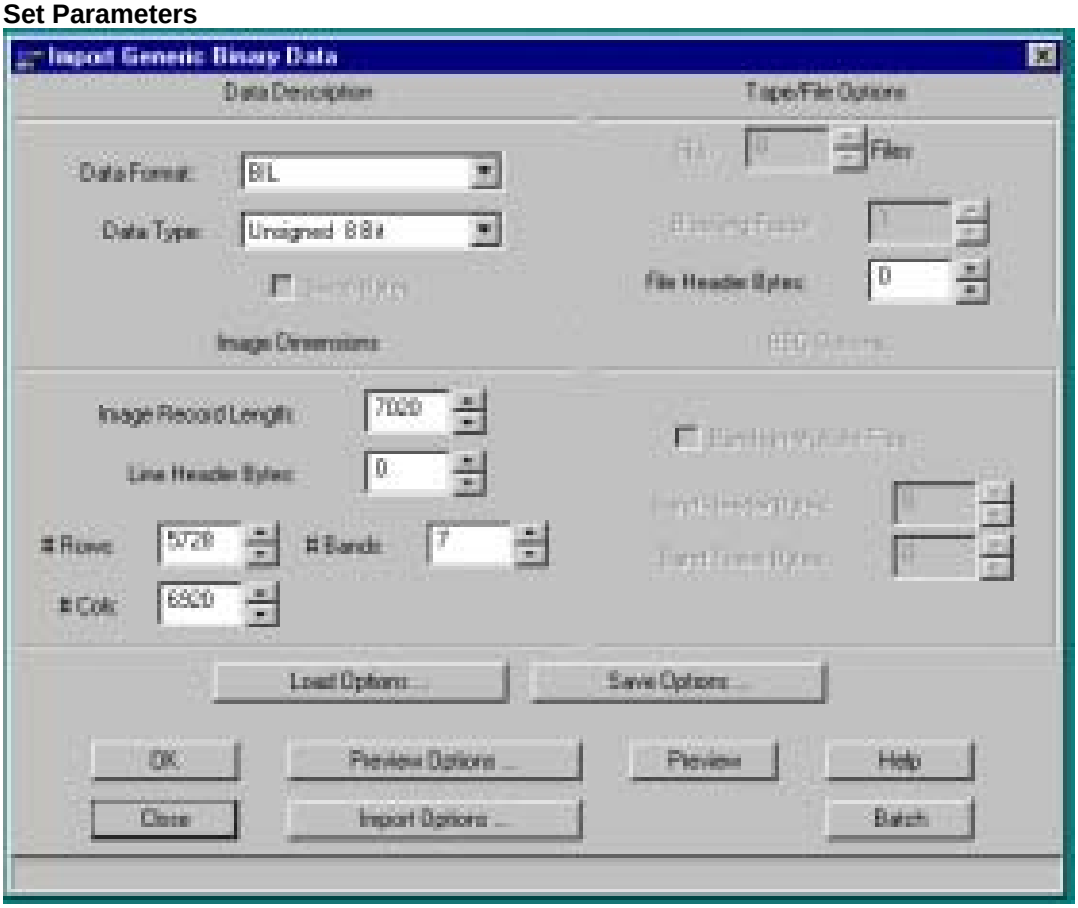
4 *Click **Data View...** button to see the PARAMETERS for **Import Generic Binary Data** box*

Figure 1-20 Import Generic Binary Data



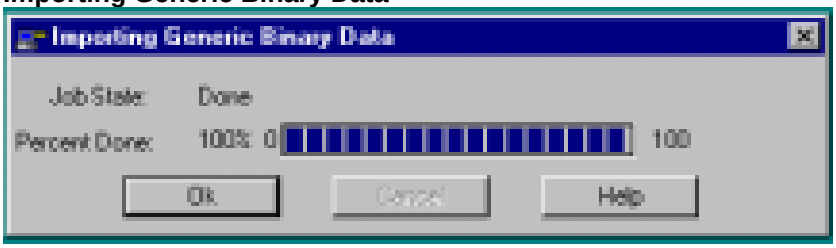
5 *Change the **PARAMETRS** by picking up the number from the **Data View...***
*then Click the **Preview** button to see how does the image look like. The last is Click **OK***
let the program process the data.

Figure 1-21 Set Parameters



Let the processing finished in **100%**, the click **OK**

Figure 1-22 Importing Generic Binary Data



To DISPLAY the image file use the same steps as mentioned in previous section **(for SPOT data)**.

Note:
LANDSAT file data characterisric (Annex. 2)
The raw data of LANDSAT consists of 7 bands. To display the LANDSAT image, a bands combination should be defined. The different bands combination, is used for various purposes of information extraction.

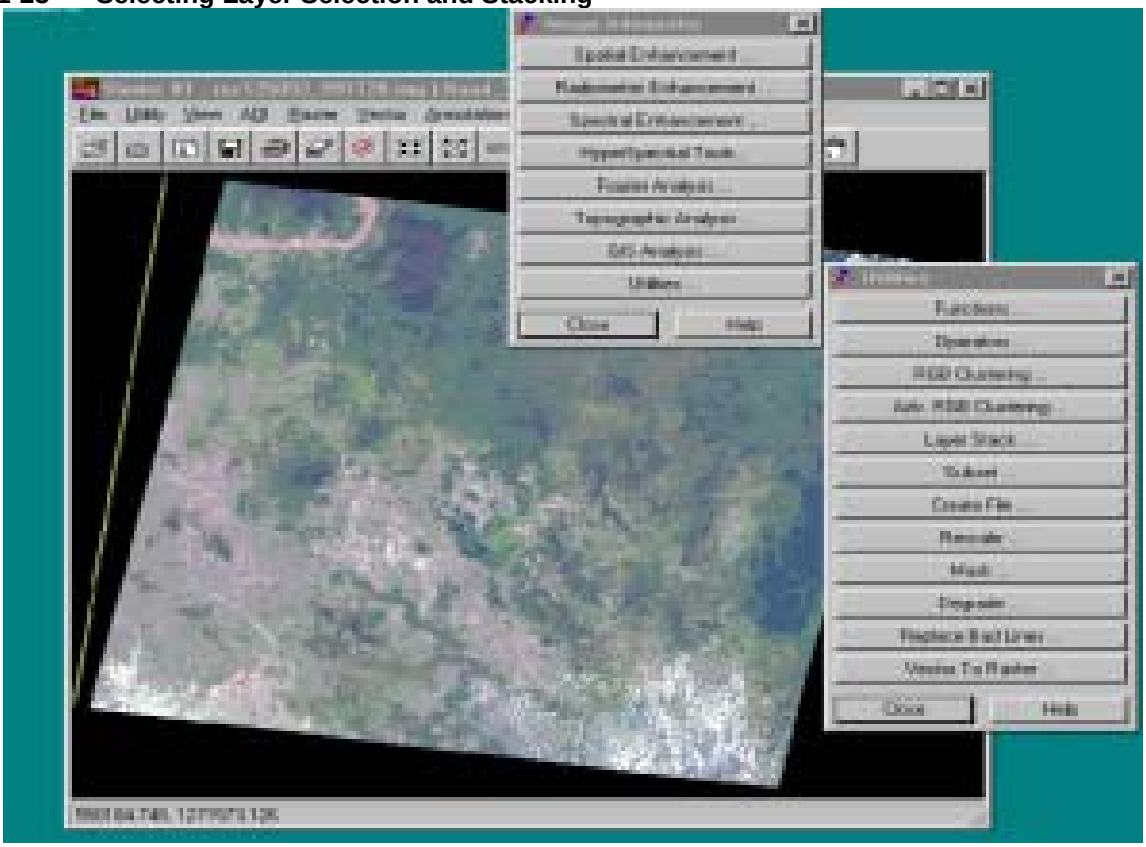
The True Color Composite (TCC) is the result of 3, 2, 1 (R,G,B) bands combination. This is called True Color Composite because the color in the image is similar to the color of the objects on the ground.
Any bands combination other than 3,2,1 (R,G,B) is called false color composite (FCC).
For example, to extract the land use information in the RSP project, the FCC bands combination of 4,5,3 (R,G,B) is used.

1.4. Using Layer Stack function to change THE BAND sequence into Correct one

The display of imported Landsat image data at bands combination 3,2,1 (R, G, B) did not show **True Color Composite (TCC)** rather the display of bands combination 4,3,2 (R, G, B) was needed to display TCC. Moreover, the careful examination of all 7 bands revealed the wrong order of band sequence as band 1 was included as band 2 in the file, band 2 as band 3, and similarly band 6 as band 7, and band 7 as band 1. To arrange the correct bands sequence, the following procedure indicated the steps to change bands sequences

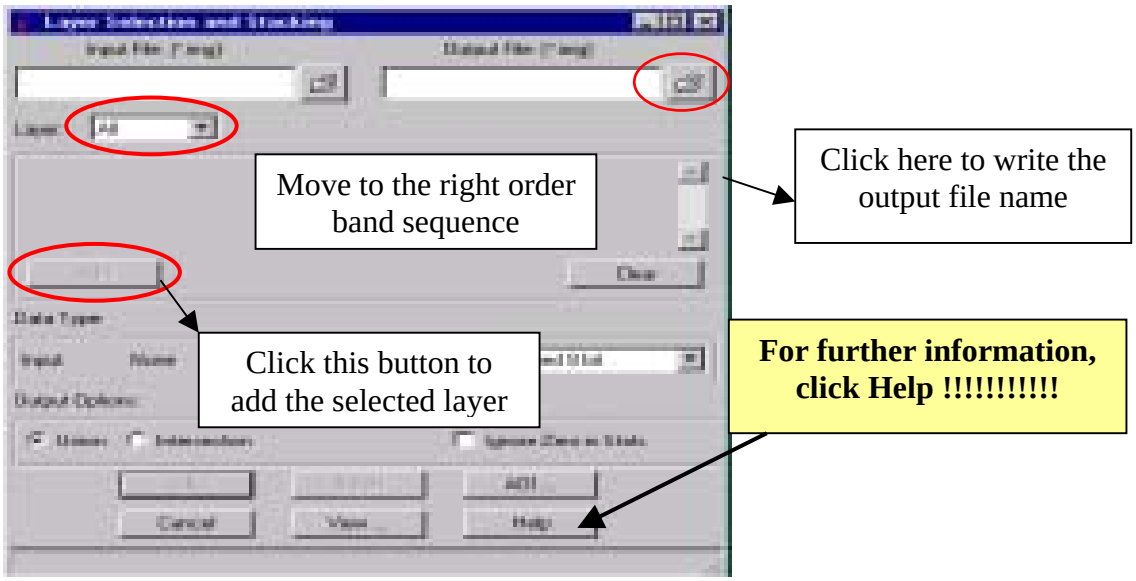
1 *Start the IMAGINE PROGRAM*
2 *Click the **Interpreter** button, the Image interpreter box will display, then Click **Utility** button, in the Utilities box click **Layer Stack,***

Figure 1-23 Selecting Layer Selection and Stacking



3 *In the Layer Selection and Stacking, click Open button in the Input File to get input file name (*img), then follow up the indications on the box. Click **OK** for the program running.*

Figure 1-24 Layer Selection and Stacking



4 *To **OPEN** the image file use the same steps as indicated in import **SPOT data** section.*

2. TOPIC 2 RECTIFICATION OF SCANNED TOPO MAP

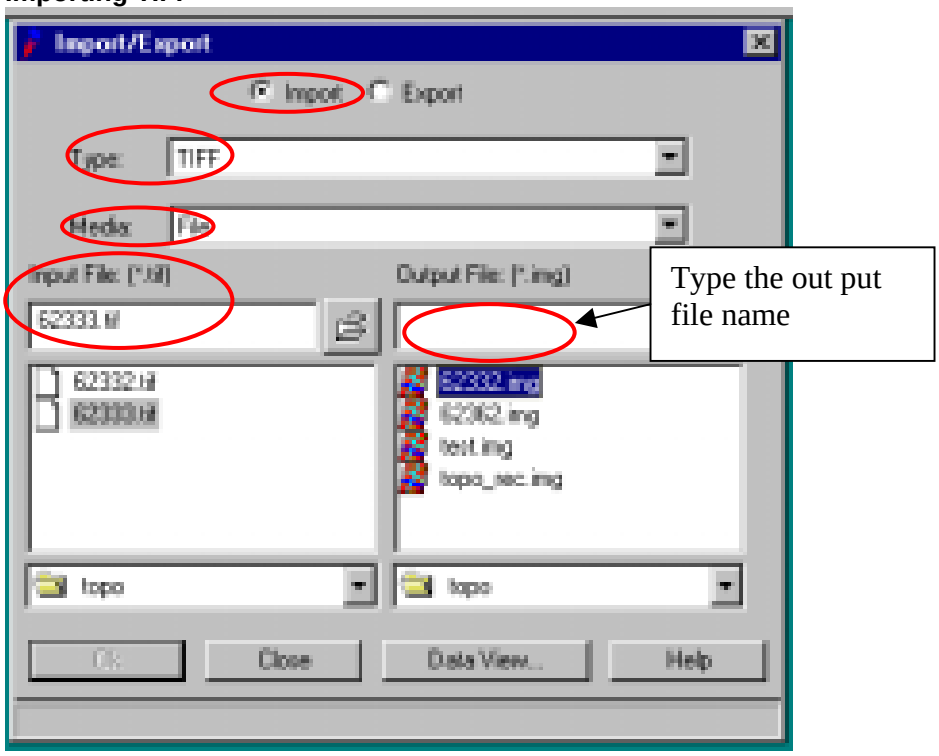
2.1. Data format

For this exercise, the scanned data of TOPO map (scale 1/50,000) was used. There can be different formats of scanned TOPO files such as JPG, TIF, and so on, that is without any geo-reference. To transfer the scanned files into the real world coordinate, the rectification process is used. Using **IMAGINE PROGRAM,** the rectification of the scanned files can be done. For this, the scanned file better be converted into imagine (.img) format.

2.2. Conversion from TIF into IMAGINE format

*1 Click the **Import** button, then change the parameters as indicated in the following window:*

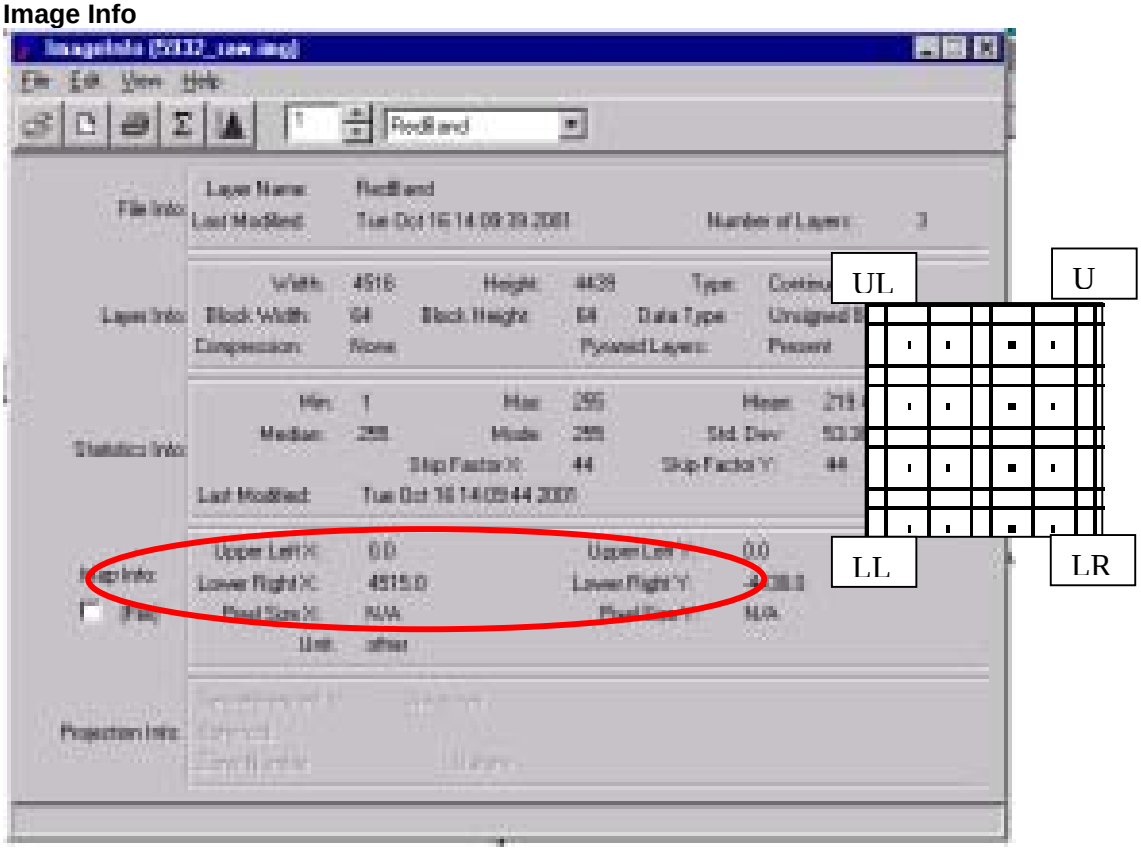
Figure 2-1 Importing TIFF



*2 Click **OK.***

3 Open the View and file name. Then check the image information. If the image is rectified the projection Info box will display the values. If not rectified, the value will not be displayed.

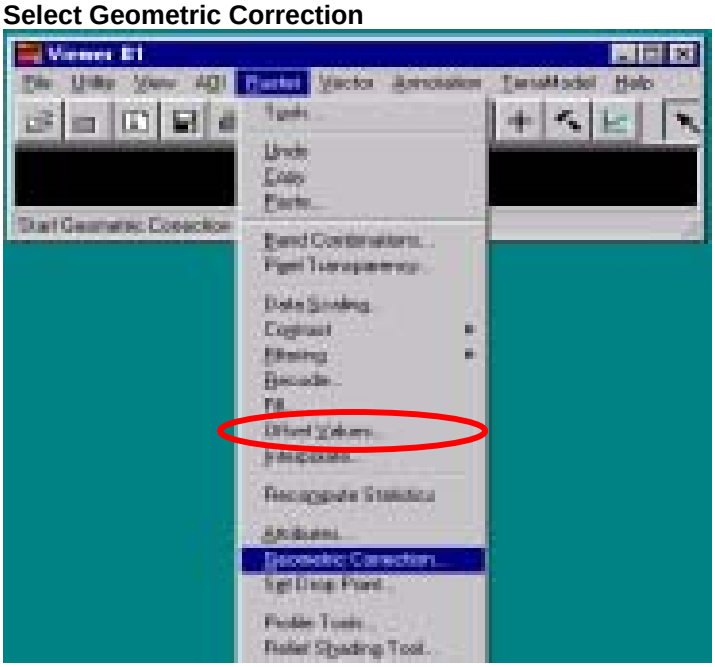
Figure 2-2 **Image Info**



2.3. Image rectification

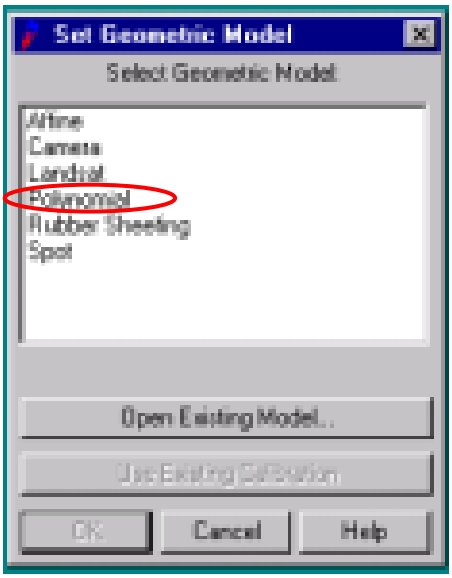
In the view window click Raster button then click Geometric Correction

Figure 2-3 **Select Geometric Correction**



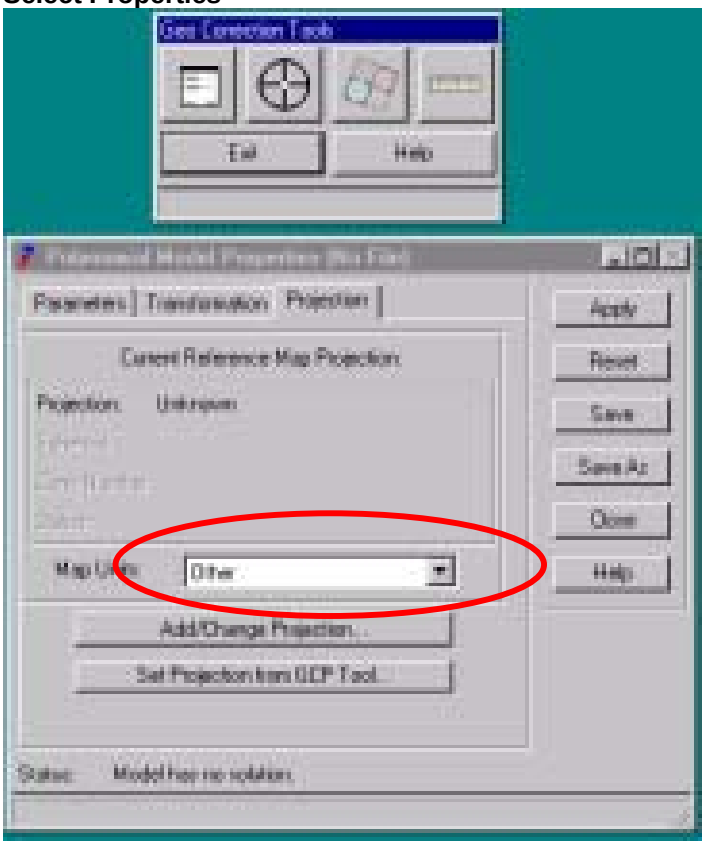
The Set Geometric Model box will be displayed. For this exercise, the **Polynomial** be selected, then Click **OK,** the **Polynomial Model Properties** will be displayed.

Figure 2-4 **Set Geometric Model**



Click **OK** of the **Set Geometric Model box**, **Polynoiaml Propertt box** will display Click **Projection** button then click **Add/Change projection button** to change the project properties.

Figure 2-5 **Select Properties**



In the **Projection Chooser** box click **Custom** button the change the parameters of the projection. For the study, the **PARAMETERS** waswere set up as the following.

Figure 2-6 **Set Parameters**

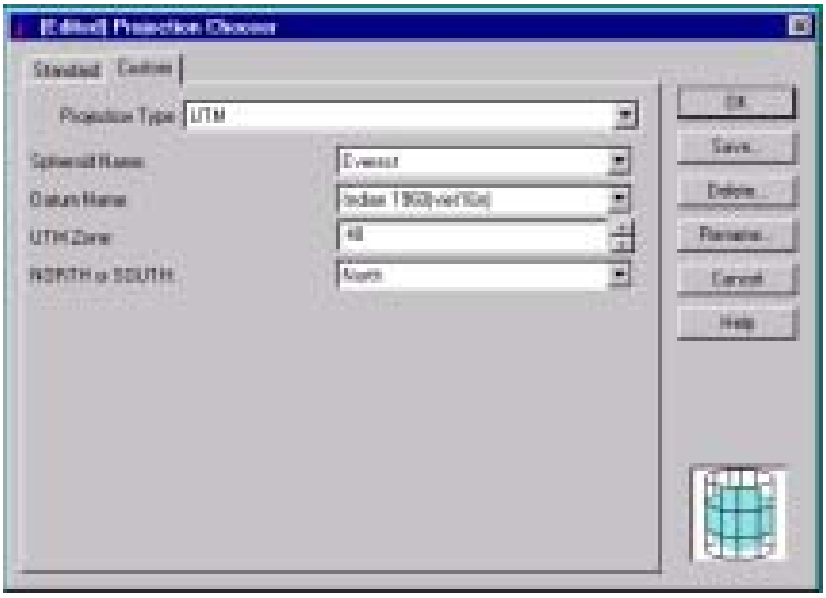


Figure 2-7 **GCP Tool Open**

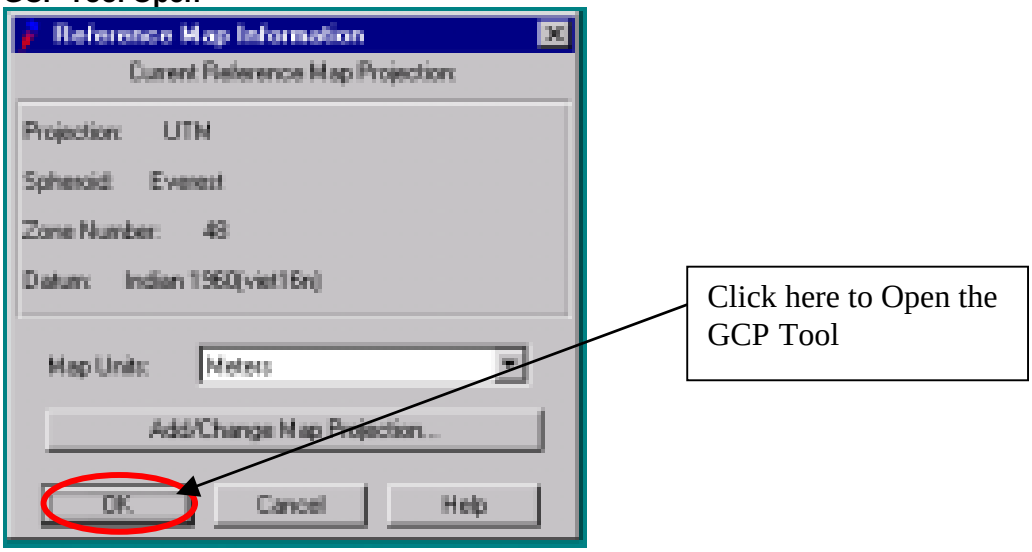
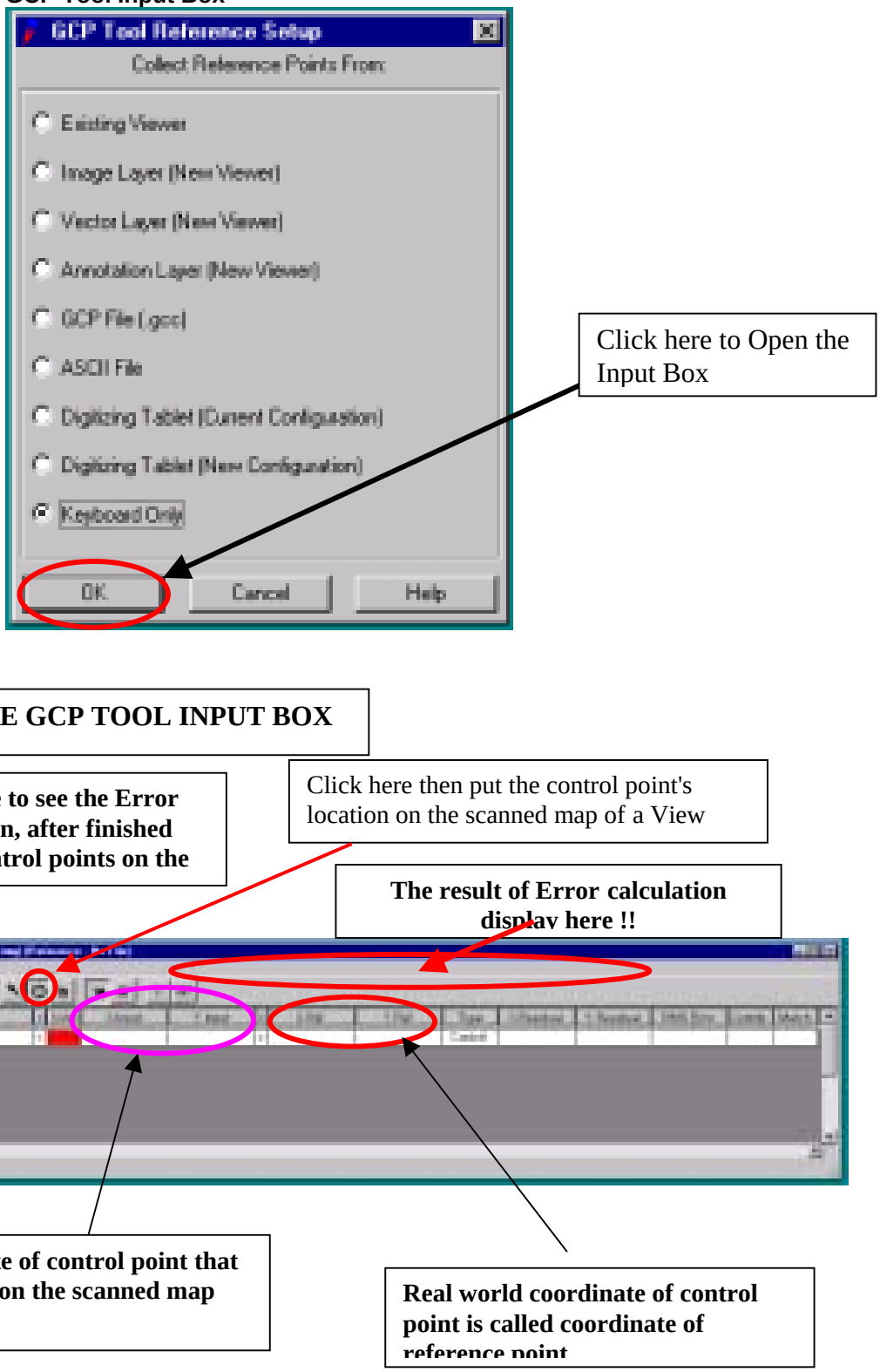


Figure 2-8 GCP Tool Input Box



Note:
For Ground Control Point (GCP):
GCP can be picked up from the original topographic map and its grid coordinate, if it is available.
GCP can be extracted from the intersection point of roads, bridge location alone the road or landmark point.
The GPS points survey can be used as GCP.
For Accuracy:
The accuracy is depended on the source and scale of the data need.
The low less of value of Error calculation indicated more accuracy.
To get more accuracy, the projection of scanned map should be the same as the projection of rectification (i.e. the same parameters)

2.4. Output file

The output file is imagine (*.img) format (along with pyramid layer *.rrd file). This file can be displayed in IMAGINE, ARCVIEW or ARC/INFO program. The image is displayed with the included coordinate system.

3. TOPIC 3 IMAGE CLIPPING (SUBSETTING)

3.1. Data Source

The data used for this exercise are LANDSAT image, existing administration boundaries (Arc/info coverage) and scanned topographic map, scale 1/50,000.

3.2. Methodology of Image Clipping

3.2.1. *Using inquire box*

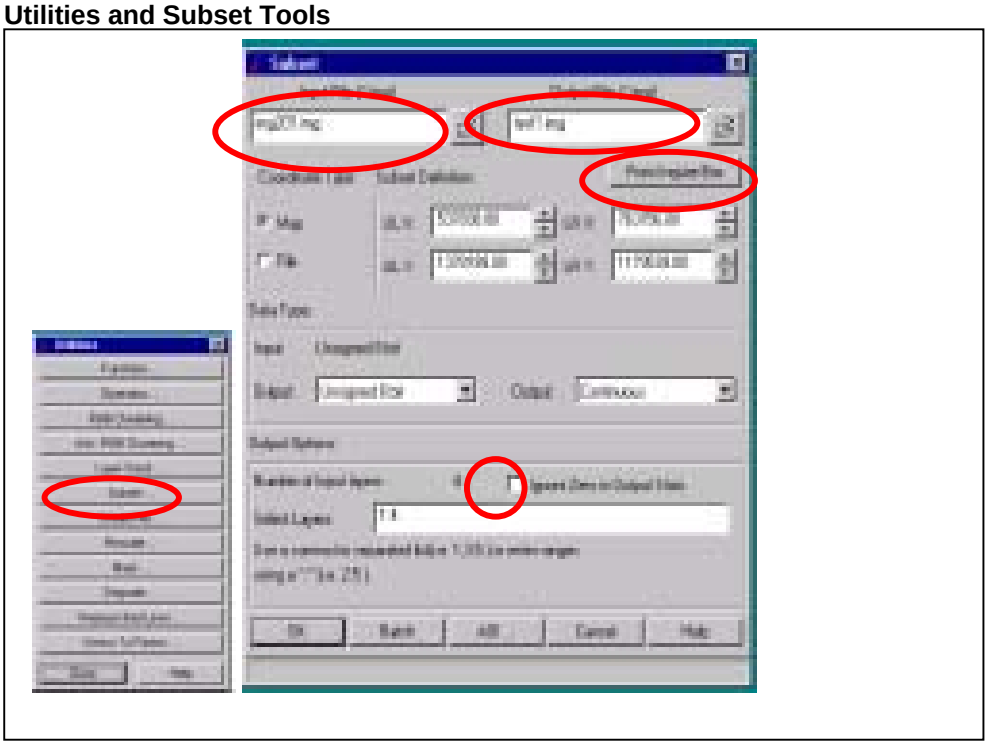
1 Open the image viewer

Figure 3-1 Open Image Viewer

2 Click the right mouse then click Inquire Box to insert the inquire box on the image viewer

3 Click on the Interpreter icon then click on the Utilities tool and click on subset tool, in the subset box fill in the parameters then click OK for processing.

Figure 3-2 **Utilities and Subset Tools**



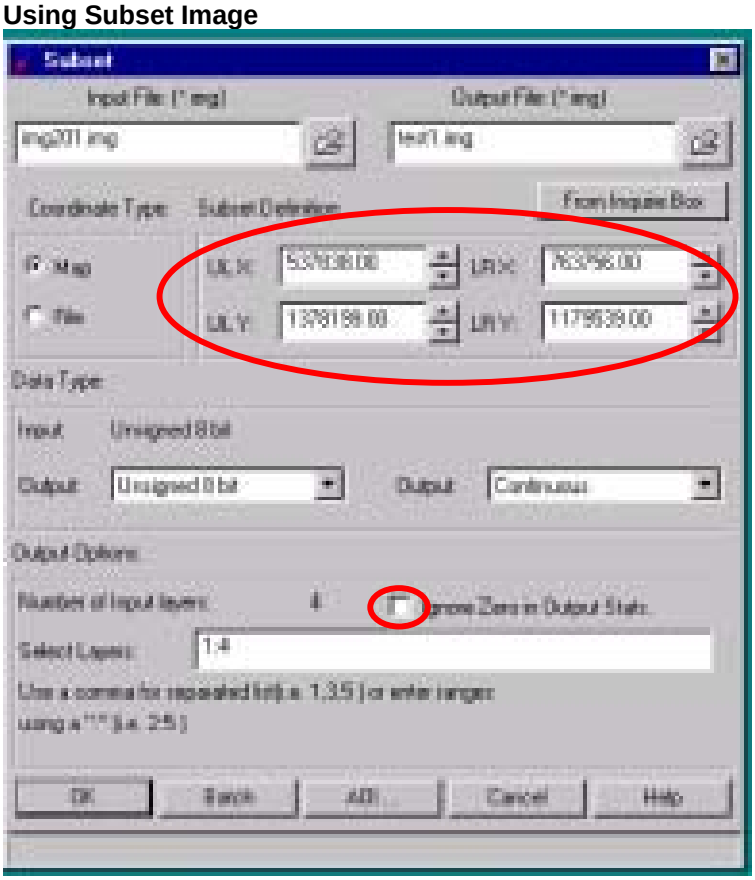
4 *Open the result image. The result is the image that clipped by an inquire box.*

Figure 3-3 **Result Image**

3.2.2. *Using subset image (from specific coordinate)*

If you know already know the ULX, ULY, LRX and LRY of the interested area, you can just input these coordinates from keyboard in the subset box, then follow up other requirement and Click OK for subset processing.

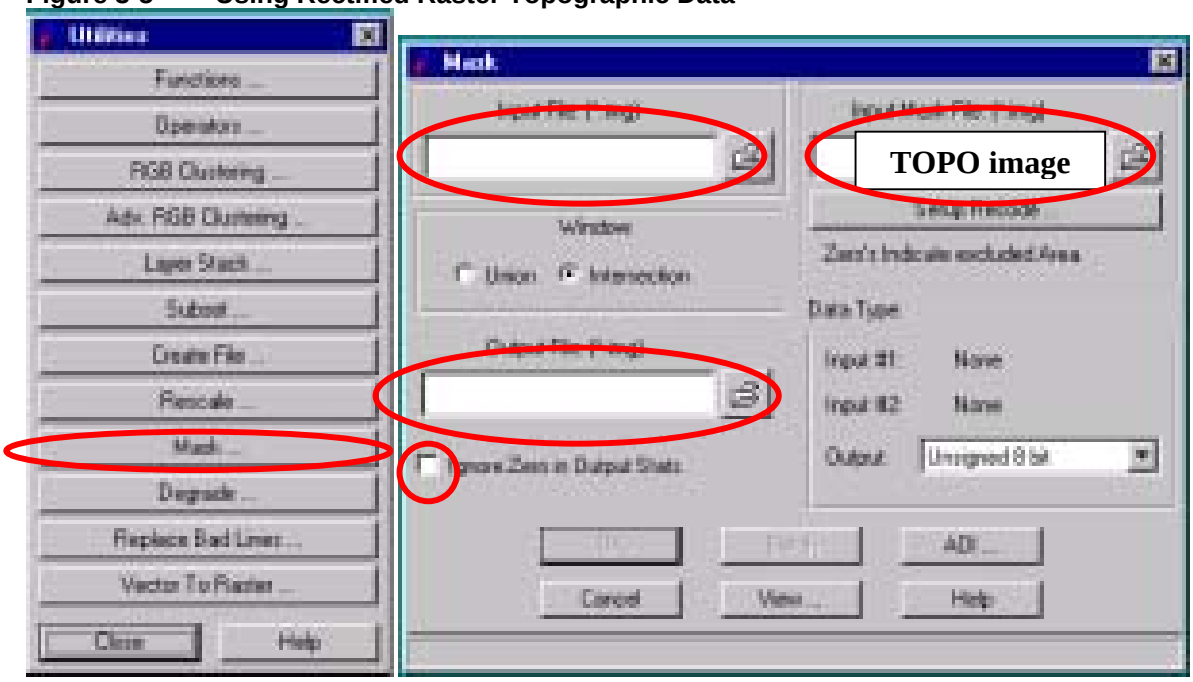
Figure 3-4 Using Subset Image



3.2.3. *Using rectified raster topographic data*

Click on the **Interpreter** icon then click on the **Utilities** tool and click on **Mask..**tool, in the Mask box use the TOPO image file to fill in the **Input Mask File.** Then fill the other parameters and click OK for processing.

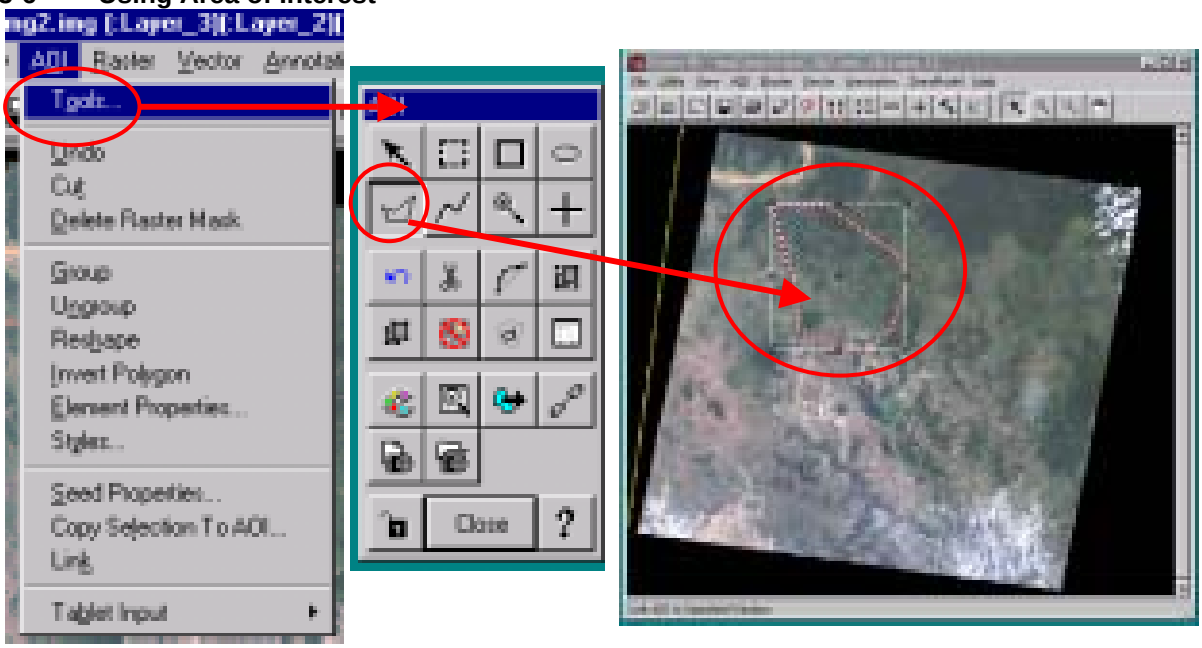
Figure 3-5 Using Rectified Raster Topographic Data



3.2.4. *Using (Area Of Interest) AOI*

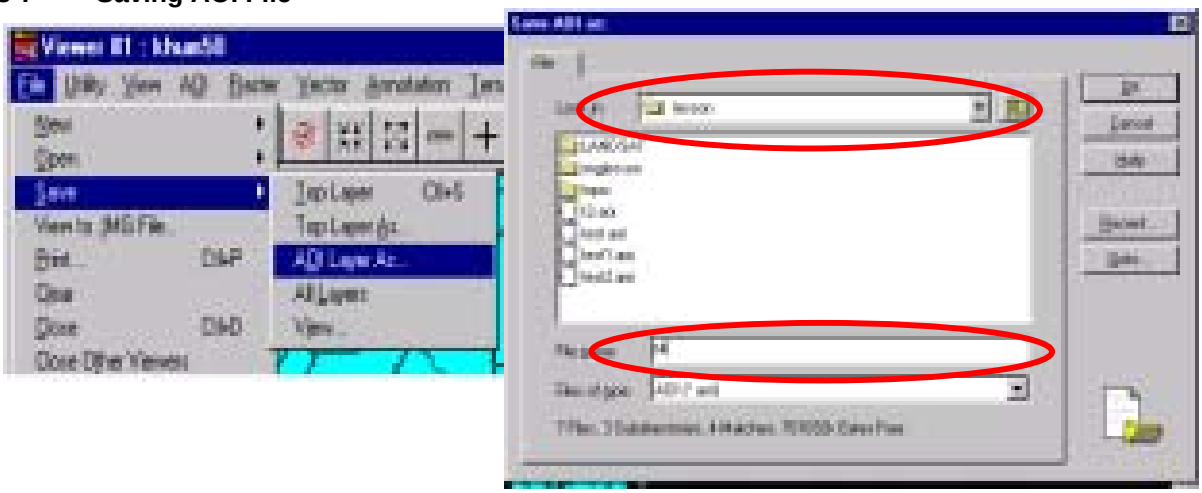
1 *Create AOI : Open the image viewer, then click* ***AOI*** *button on the viewer and click* ***Tools..*** *button the AOI tool box will be displayed, and click the* ***drawing*** *button to draw a polygon on the image.*

Figure 3-6 Using Area of Interest



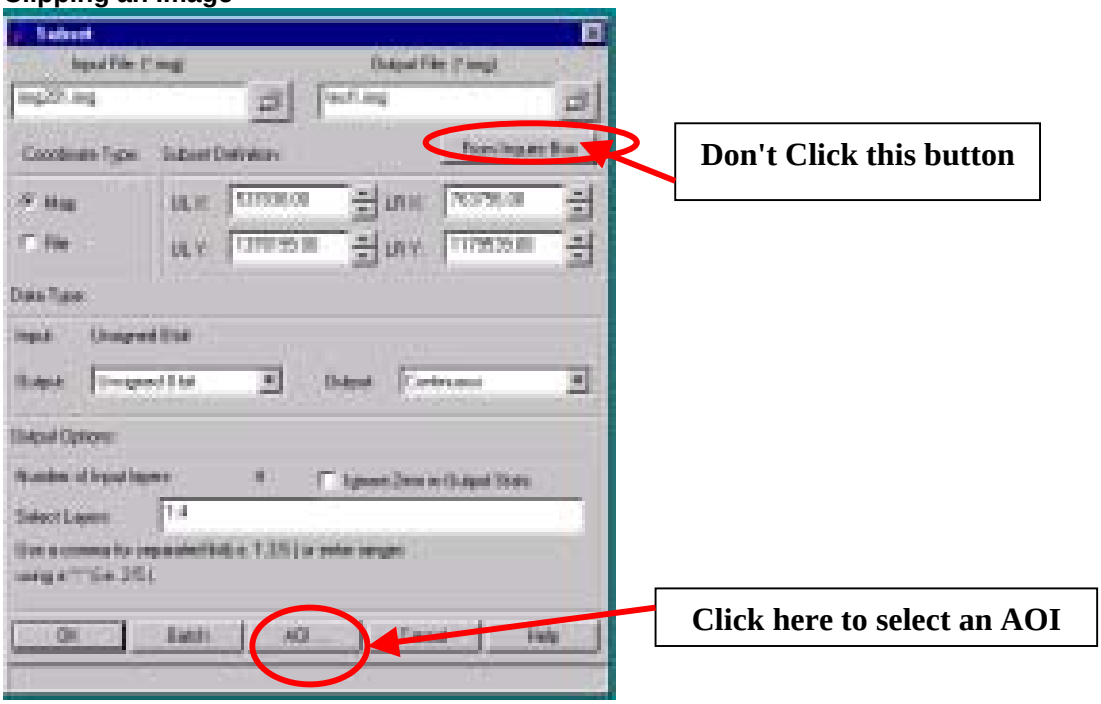
2 *Save the AOI drawing as **AOI file.** In the Viewer click **File** then **Save** button and then **AOI Layer As.** In the **Save AOI as** box, change to the **working directory** and type the **AOI file** name. Click **OK** for processing.*

Figure 3-7 Saving AOI File



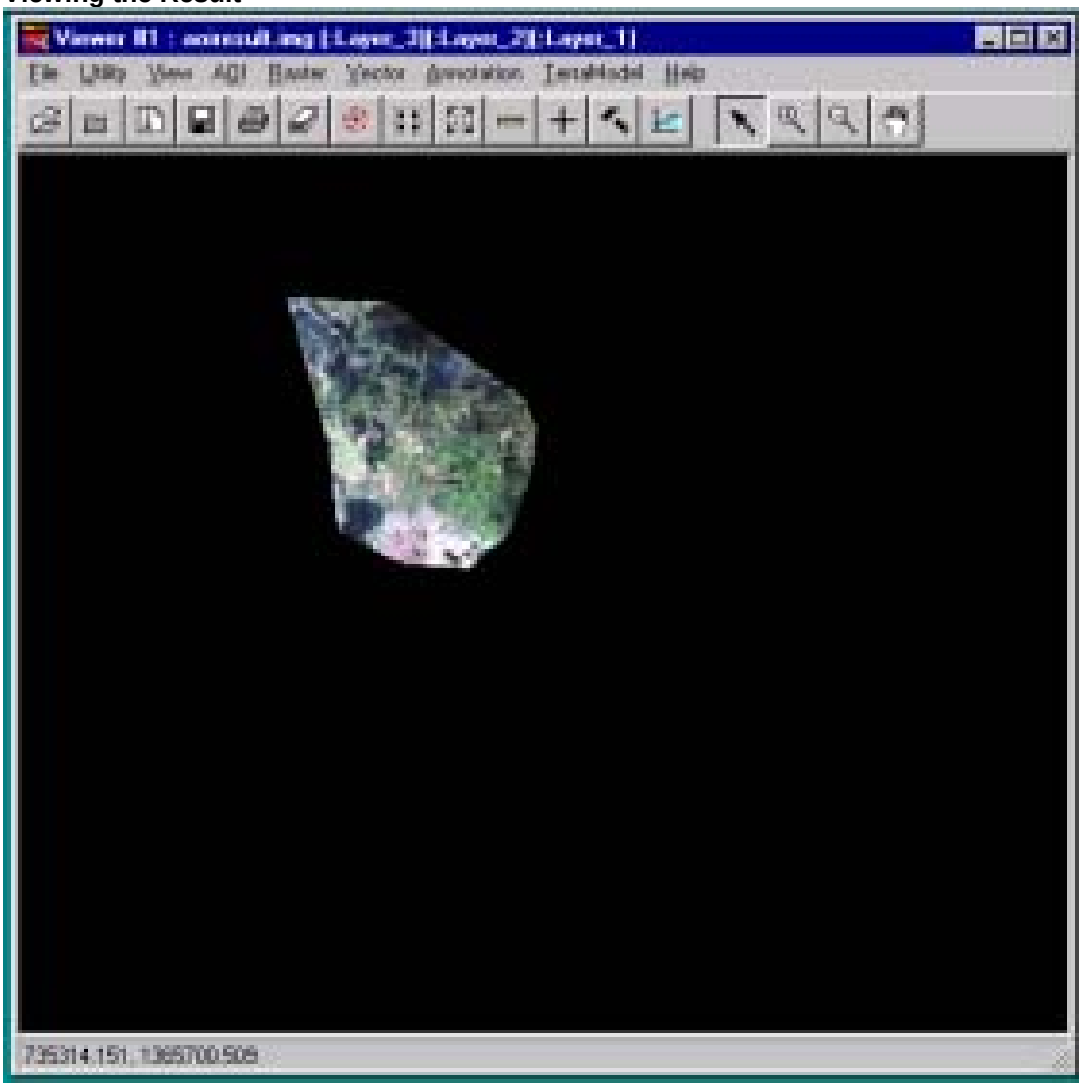
3 *Use **Subset** tool to clip the image with the created AOI*

Figure 3-8 Clipping an Image



4 Viewing the result

Figure 3-9 Viewing the Result

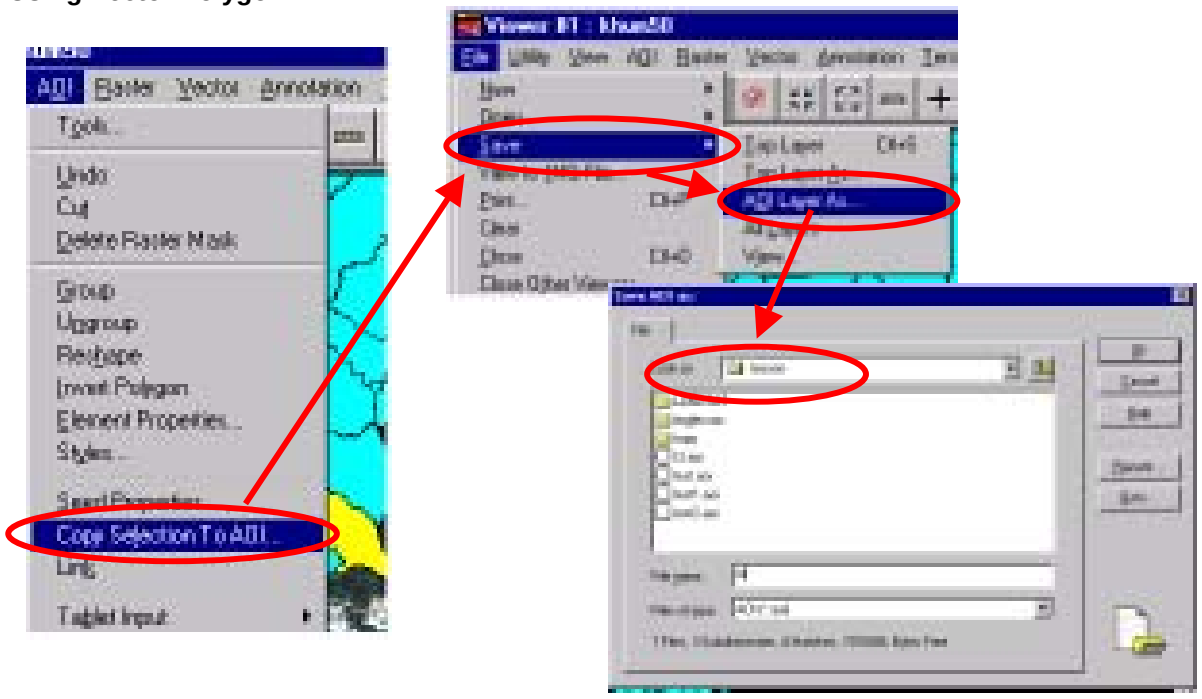


3.2.5. *Using Vector Polygon*

In this exercise, a polygon of admin unit is selected as an AOI layer to clip an image.

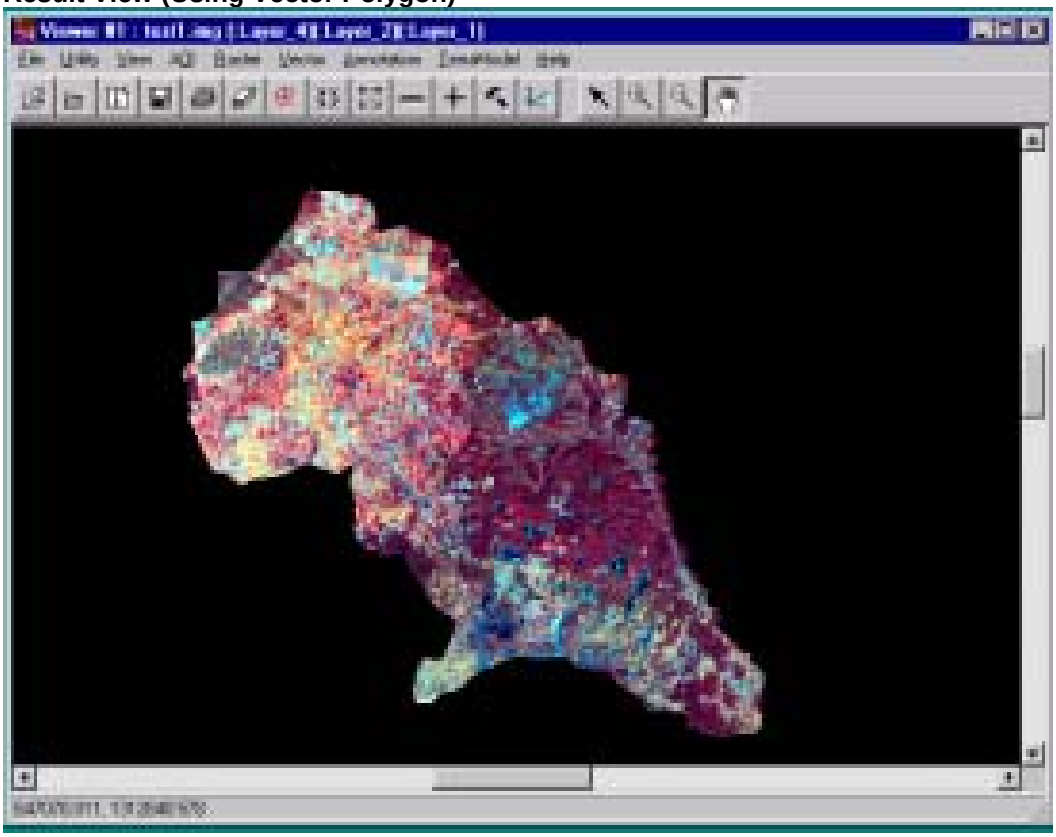
1 *Display a polygon layer overlay on the image viewer*
2 *Click the Vector button, then Viewing properties to set up the polygon layer*
3 *On the Viewer select a specific polygon, then click* ***AOI*** *and* ***Copy Selection To AOI,*** *and save as an AOI file*

Figure 3-10 Using Vector Polygon



4 *Use Subset to clip the image*
5 *View the result*

Figure 3-11 Result View (Using Vector Polygon)



4. TOPIC 4 LANDSAT IMAGE RECTIFICATION

4.1. Data preparation

1. Data sources: LANDSAT TM (Raw data), scale: 1/100,000, Resolution 30m x 30m, Scence No 125:052.
2. Scanned Topographic map, scale: 1/50,000, Map sheet: 6233III, Rectified, Data format: *.img
3. Scanned Topographic map, scale: 1/100,000, Map sheet: 6133, Rectified, Data format: *.img

4.2. Data import

1. Import LANSAT RAW DATA

Using the import data method to convert the LANDSAT raw data into IMAGINE format (*.img). Then use Layers Stake to get the right bands combination as true color.

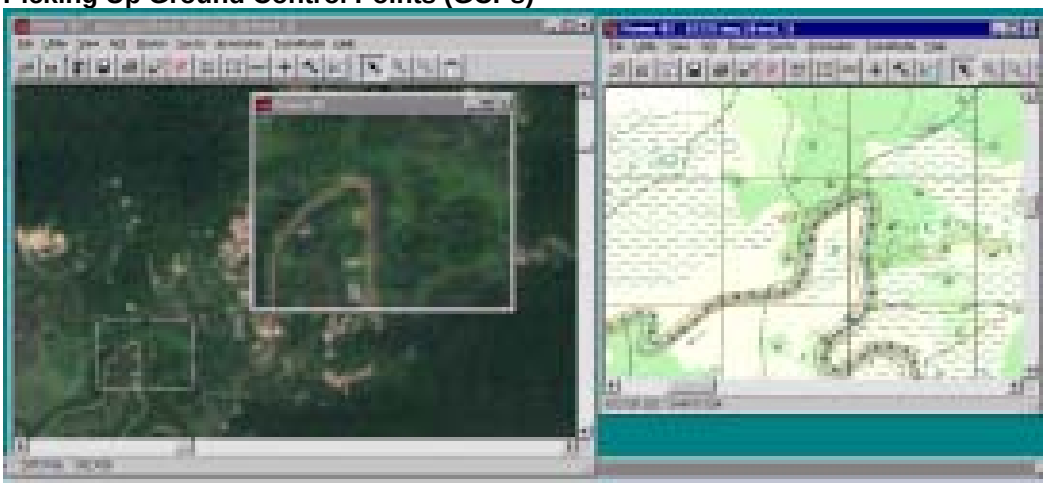
2. Import Topographic map

If the scanned topographic maps are in other format such as *.GRID or *.TIF, it should be converted into IMAGINE format (*.img). Then check the *required projection parameters.*

4.3. Picking up ground control points (GCPs)

To pick up the ground control points from the LANDSAT and topographic map, it should be looked for the reference location such as the intersection point of roads, bridge location alone the road etc. As shown in the following example, where the road intersection was not visible, the GCP was picked up even from the meandering point of river.

Figure 4-1 Picking Up Ground Control Points (GCPs)



4.4. Rectification

This was done by using Topographic map as reference data to the LANDSAT image. (see following examples)

Figure 4-2 **Example: Ground Control Point No 1, river turning**

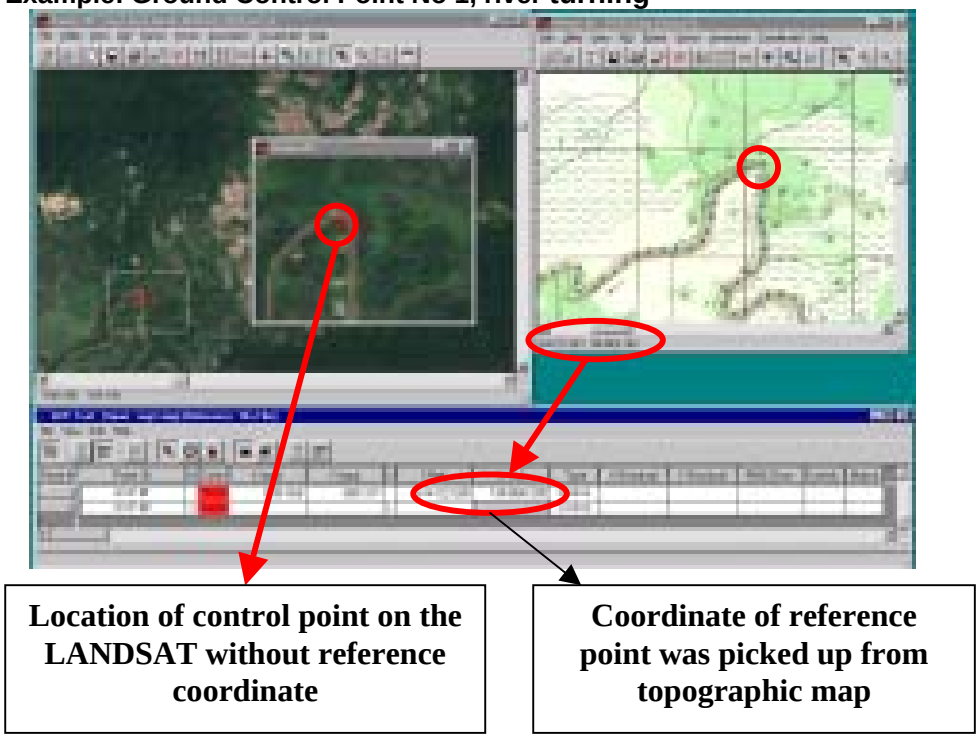


Figure 4-3 **Example: The Ground Control Point No 2, river turning**

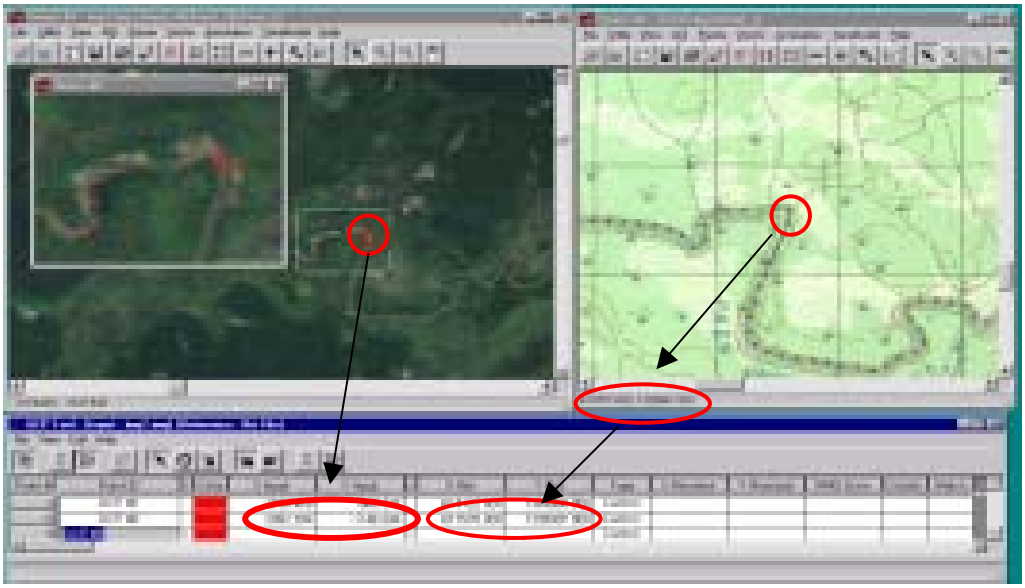


Figure 4-4 **Example: The Ground Control Point No 3, river turning**

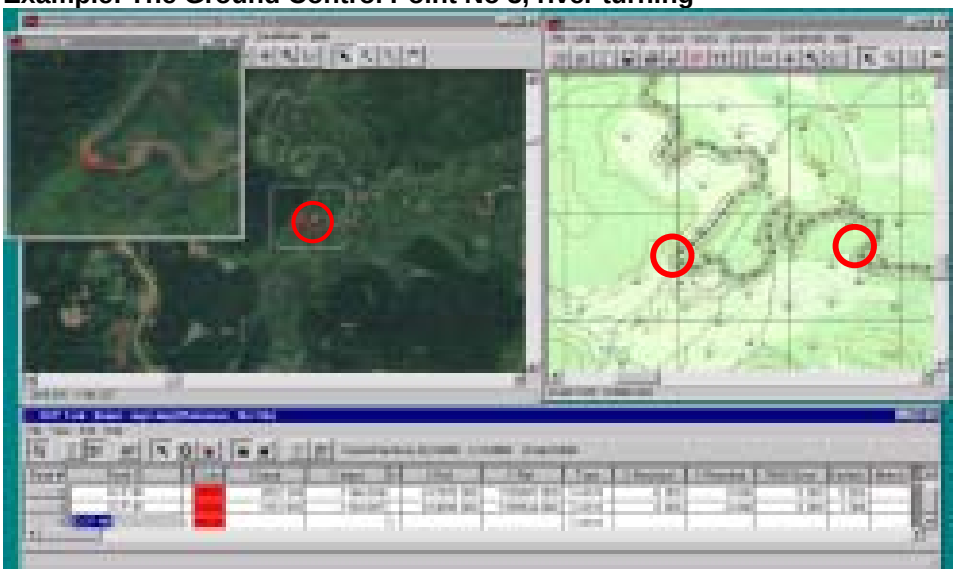
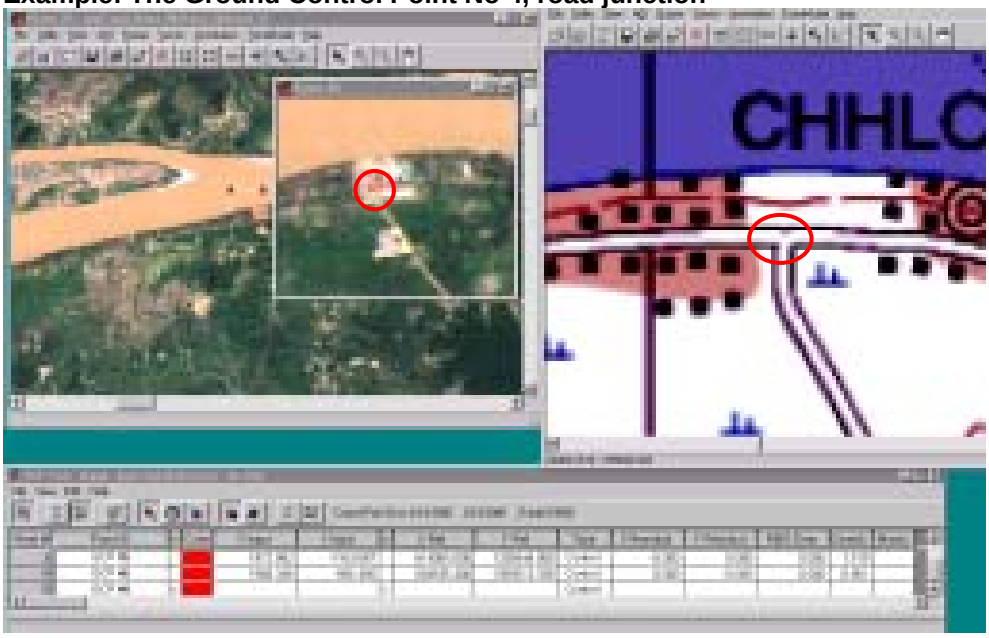


Figure 4-5 **Example: The Ground Control Point No 4, road junction**



4.5. Rectification Quality Evaluation

The quality of rectification is depended on the amount of Ground Control Points and their distribution on the LANDSAT. To achieve better result, it may be needed to perform the rectification more than once. The following pictures indicated some features of rectified image in combination with the base data.

Figure 4-6 Rectified Image in Combination with Base Data

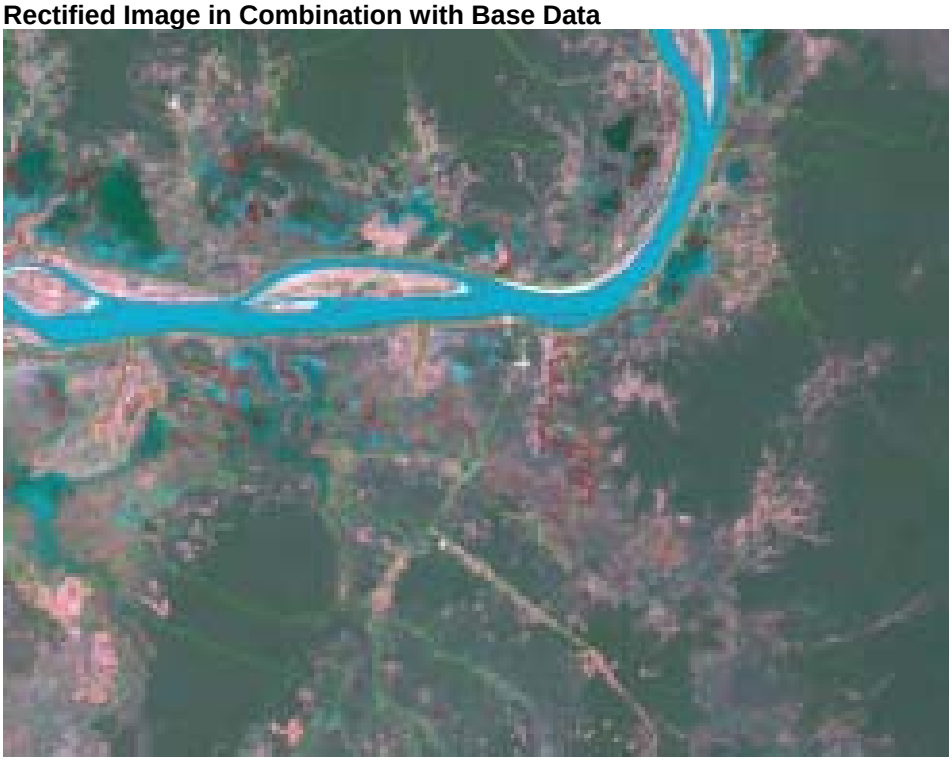
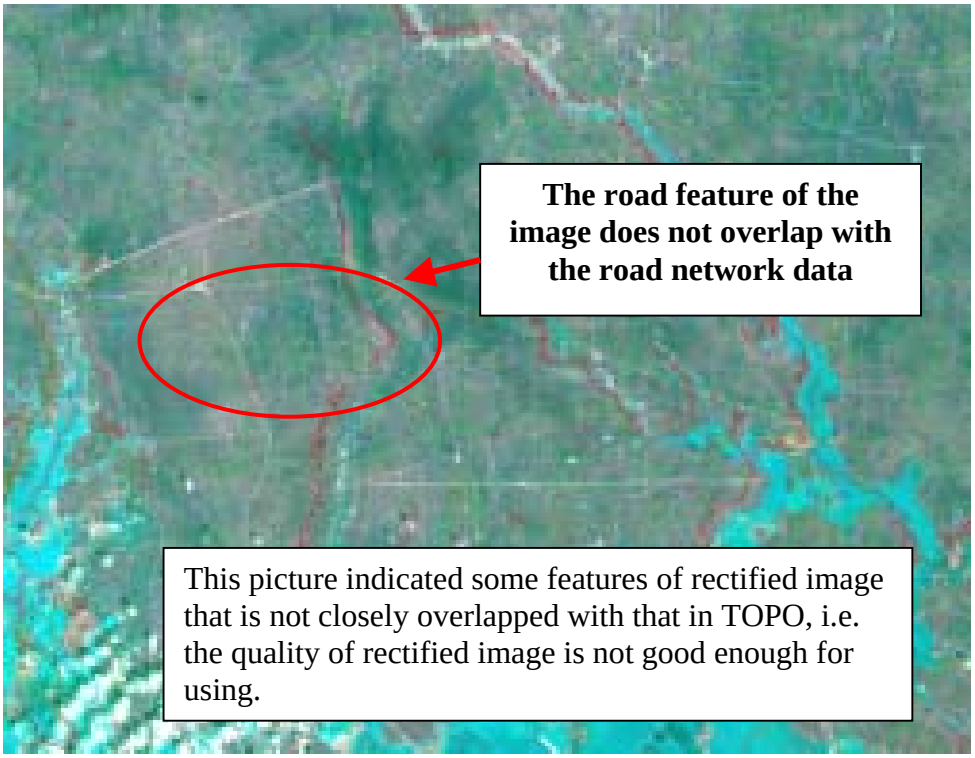


Figure 4-7 Road Feature Mismatch Sample



Using swipe function to check the quality of the result

1- *Open the image and the base map that the GCPs were picked up on the same **Viewer**.*
2- *Click the **Utilities** button then **Swipe..** button to check the overlap feature between rectified image and base map.*

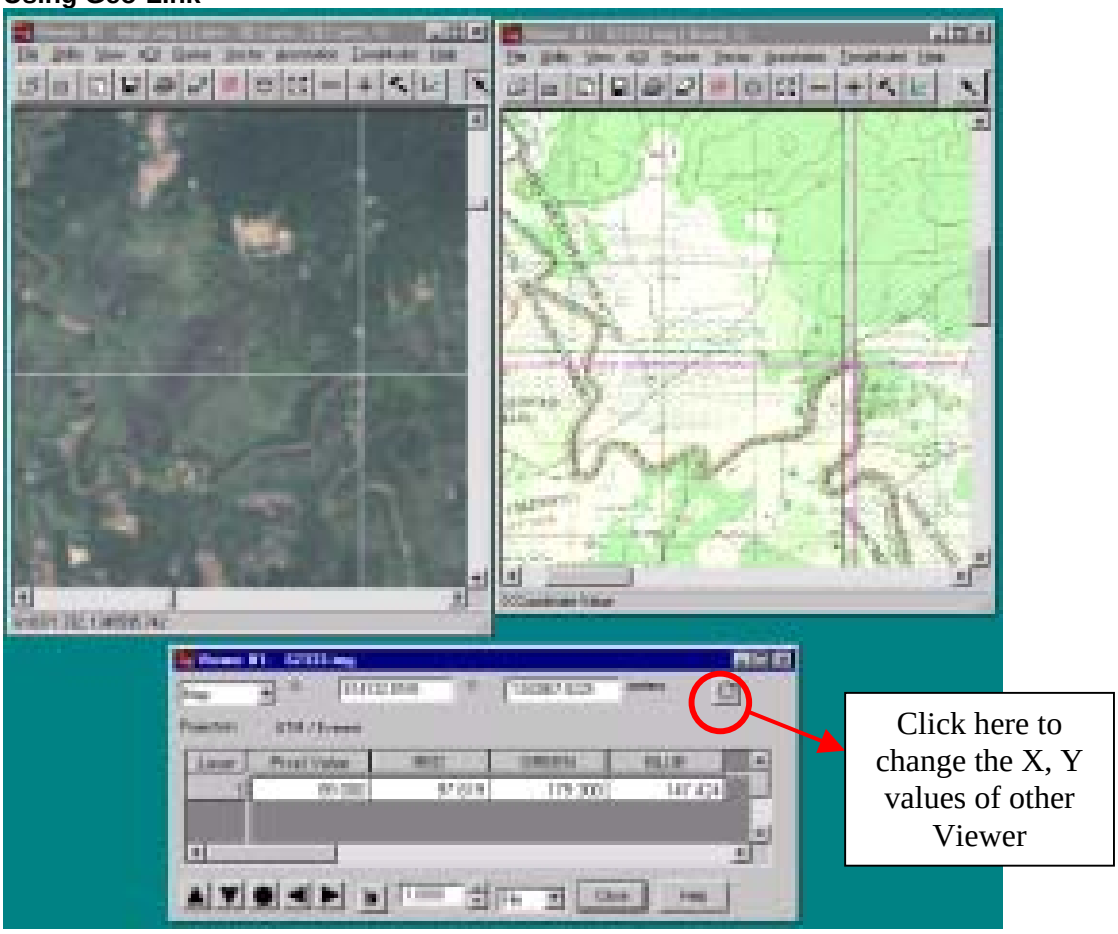
Using geo-link to check the quality of the result and calculate the shifting X and Y (ΔX; ΔY)

1- *Open the **rectified image** in a viewer and the **base map** in other viewer.*
2- *Click the **right mouse**, then click **Geolink** button*

Figure 4-8 Selecting Geolink

3- *Click the **right mouse**, then click **Inquire Cursor** button, move the cursor to the location that needed to be check.*
4- *Copy the X and Y values from the image and base map at the same location.*
5- *Calculate the **ΔX; ΔY**.*

Figure 4-9 Using Geo-Link



Note:
If the values of ΔX; ΔY are closed to ZERO the rectification result is better.
When the values of ΔX; ΔY are higher, the GCPs distribution needs to be checked and more appropriate GCPs need to be added, then run resampling again.

5. TOPIC 5 SPOT IMAGE RECTIFICATION

5.1. Data format

There are different formats of SPOT data either in IMAGINE file or RAW data. If the SPOT is formatted as RAW data, it should be converted into IMAGINE file by using IMPORT method.

To keep the import SPOT data in the required projection system, the process so called RECTIFICATION needs to employ. The ground control points (GCP) required for this process can be collected from existing GIS database, hard copy map, or the coordinates collected by Global Positioning System (GPS), and so on.

5.2. Data sources

The data using in this exercise are:

1- SPOT RAW DATA (Phase I project), Scene (2 272-327), 92/11/16

2- Road network Arc/info coverage

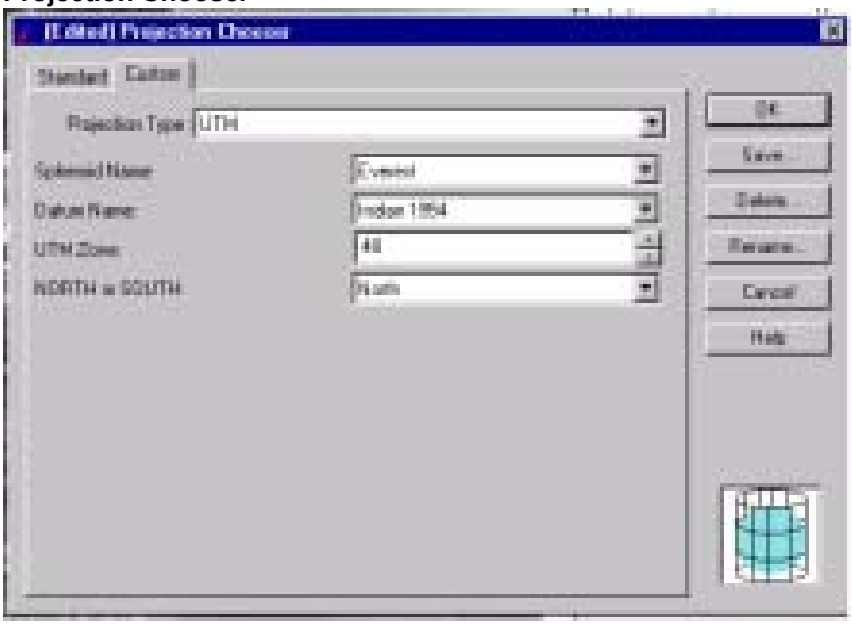
Characteristic:

PROJECTION : UTM, Meters, Zn: 48, Sph.: Everest 1830, Dat.: Indian 1954
FEATURE TYPE : LINE
DESCRIPTION : Roads and road related line data

3- Scanned topographic map, scale: 1/100,000, rectified in the same as Arc/info coverage's projection.

NOTE: The image information should be checked before starting rectification.

図 5-1 Projection Chooser



5.3. Rectification

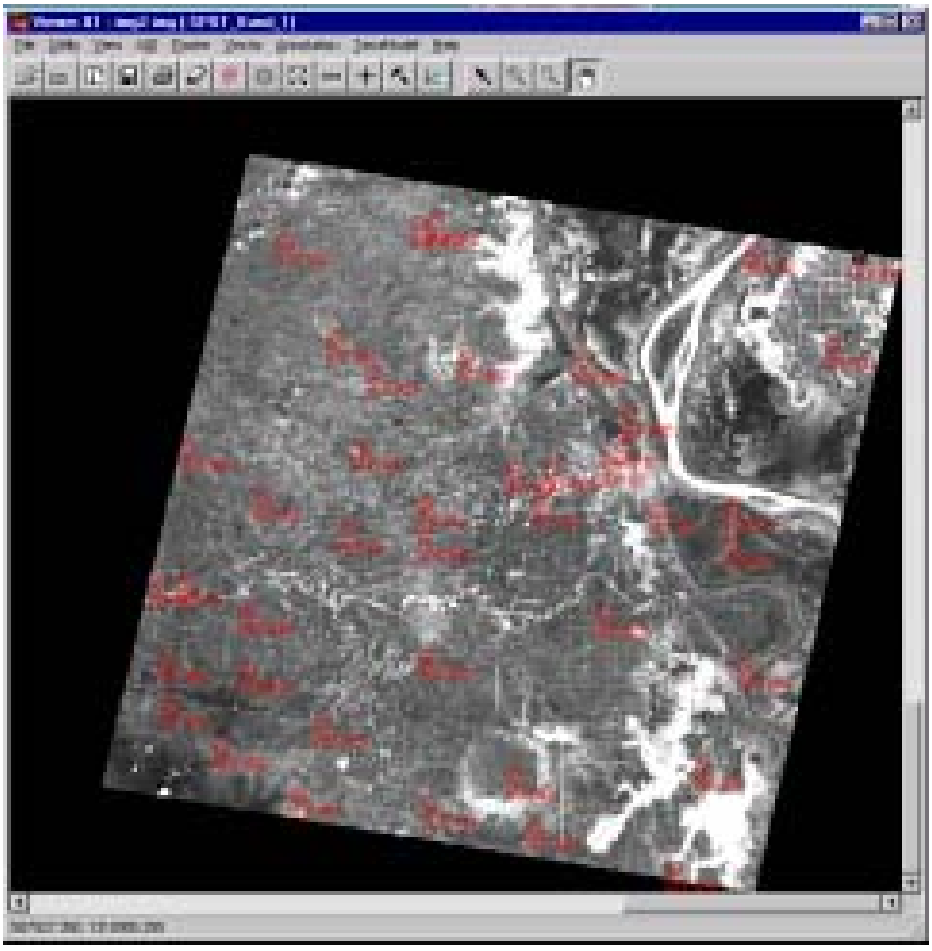
Using the procedures of rectification of scanned topographic map, scale 1/50,000 to rectify the SPOT data.

It should be given main priority to collect the GCPs from diversified locations of the image so that the collected GCPs remain well distributed throughout the image.

> ***NOTE:***
> ***Less GCP distribution on the image causes poor rectification result. When the rectification result is not good enough, more good GCPs should be added and resampling step should be run again.***

In the exercise the distribution of GCP is indicated as the following.

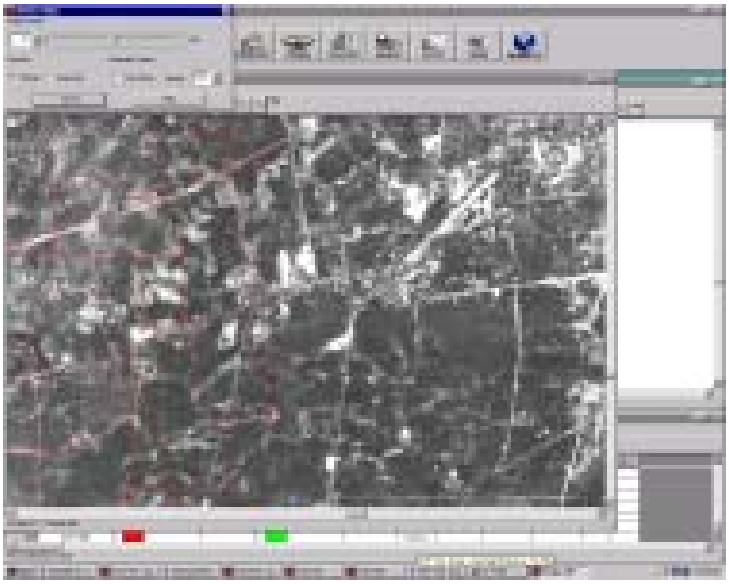
Figure 5-1 GCPs



5.4. Result evaluation

The procedure for evaluating the SPOT rectification result is similar to that of evaluating the LANDSAT rectification. The following is the result of final SPOT rectification process performed in this exercise.

Figure 5-2 Result Evaluation



6. TOPIC 6 DIGITAL ELEVATION MODEL (DEM) CREATION

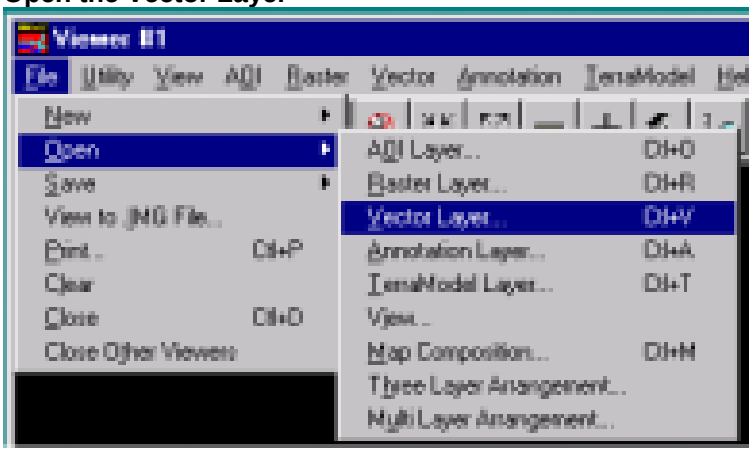
6.1. 6.1 Data source

Contour data of part of RSP Phase 1, near to Phnom Penh.

6.2. Procedure

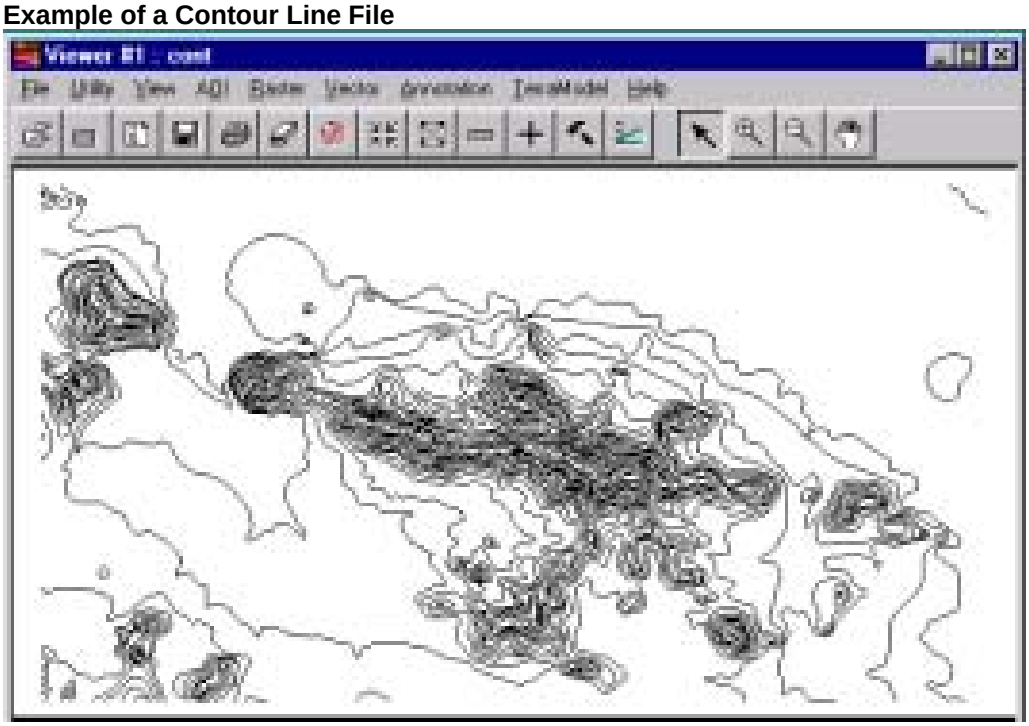
*1 Open the Vector layer on the **Viewer***

Figure 6-1 Open the Vector Layer



2 Change to the working directory in the open box then select the contour line file name. The following is an example of a contour line file

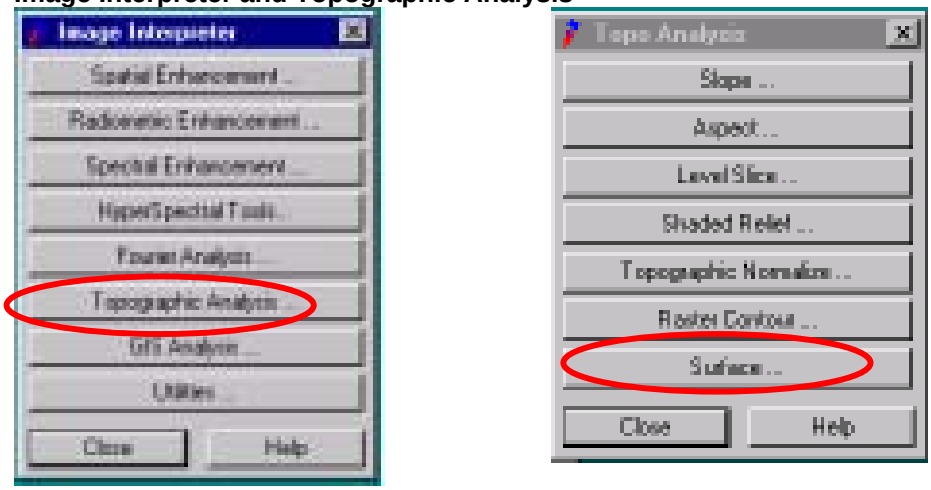
Figure 6-2 Example of a Contour Line File



3 Check the information of the contour line

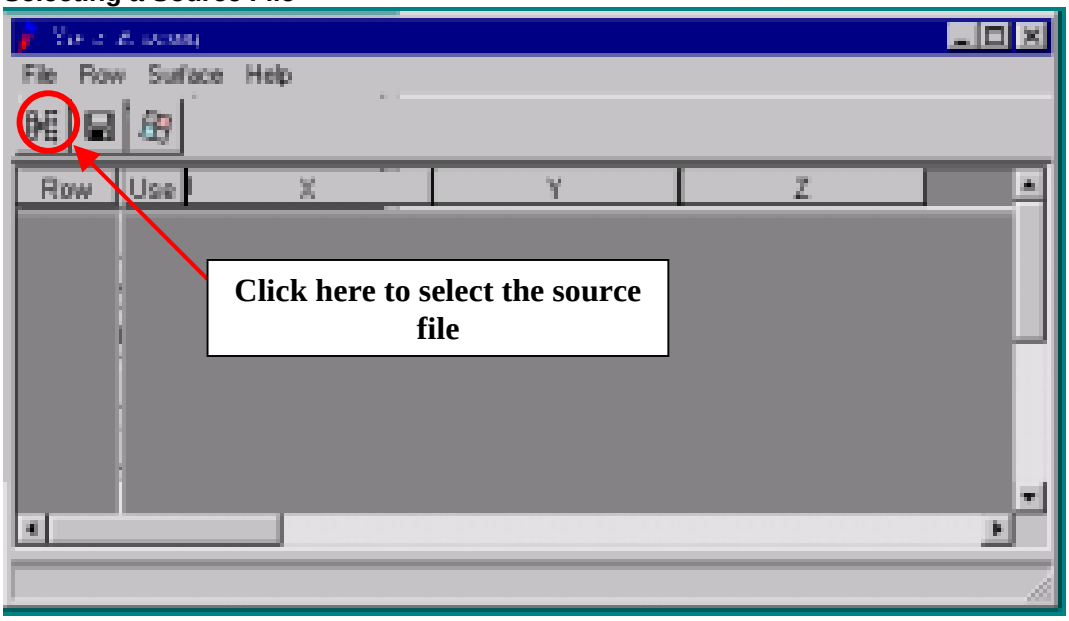
*4 In the Viewer, click the **Interpreter** button, then click the **Topographic Analysis...** and click **Surface..** button.*

Figure 6-3 **Image Interpreter and Topographic Analysis**



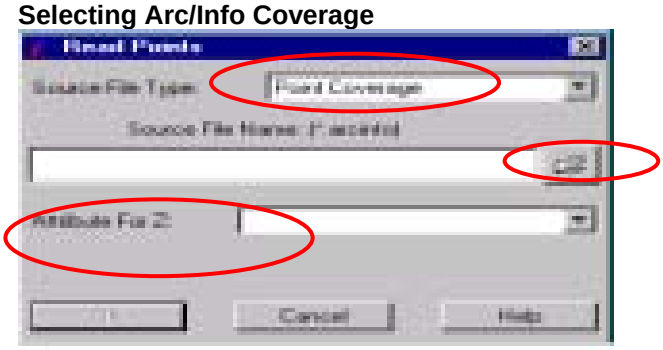
*5 In the **Surface** box refer to the input file by clicking following button:*

Figure 6-4 **Selecting a Source File**



6 The following box will be displayed for select Arc/info coverage.

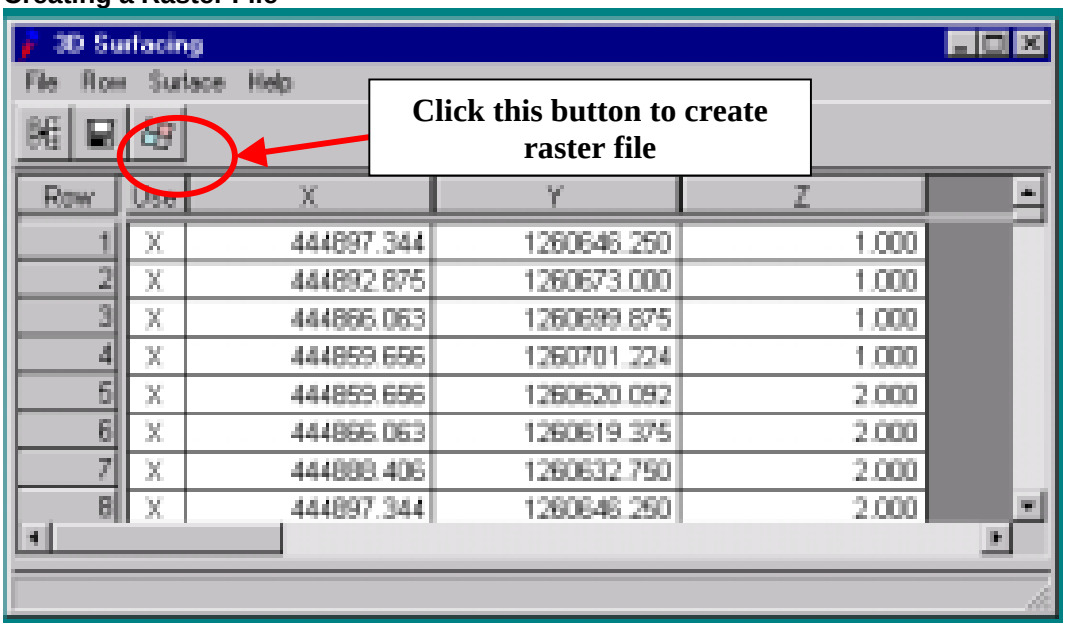
Figure 6-5 Selecting Arc/Info Coverage



Indicate whether the input file is Point or Line coverage, fill the source file name, and mention the name of Item containing the Z value.

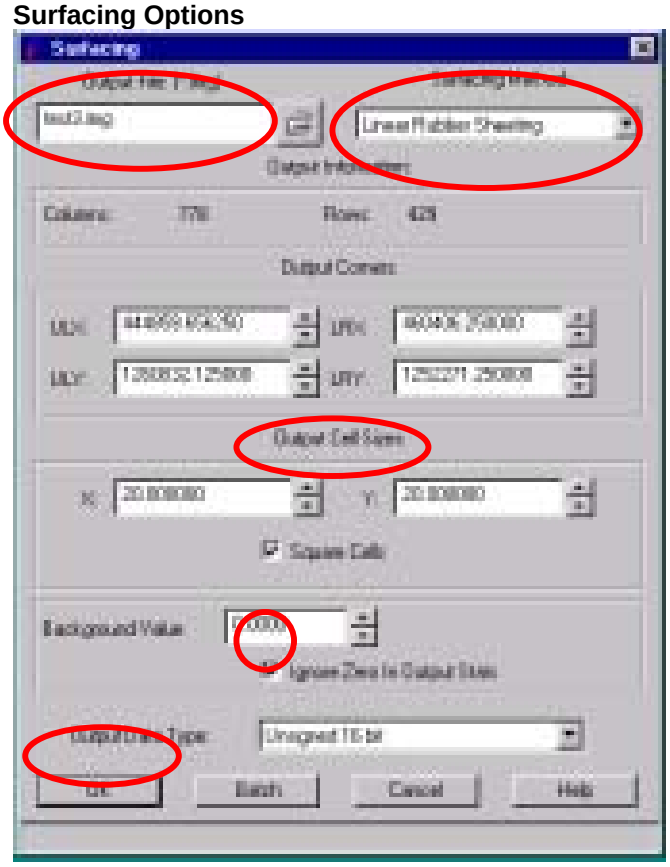
7 Click the surfacing button (as shown below) to create raster file

Figure 6-6 Creating a Raster File



8 *The surface box will be displayed, fill in the requirement.*

Figure 6-7 **Surfacing Options**

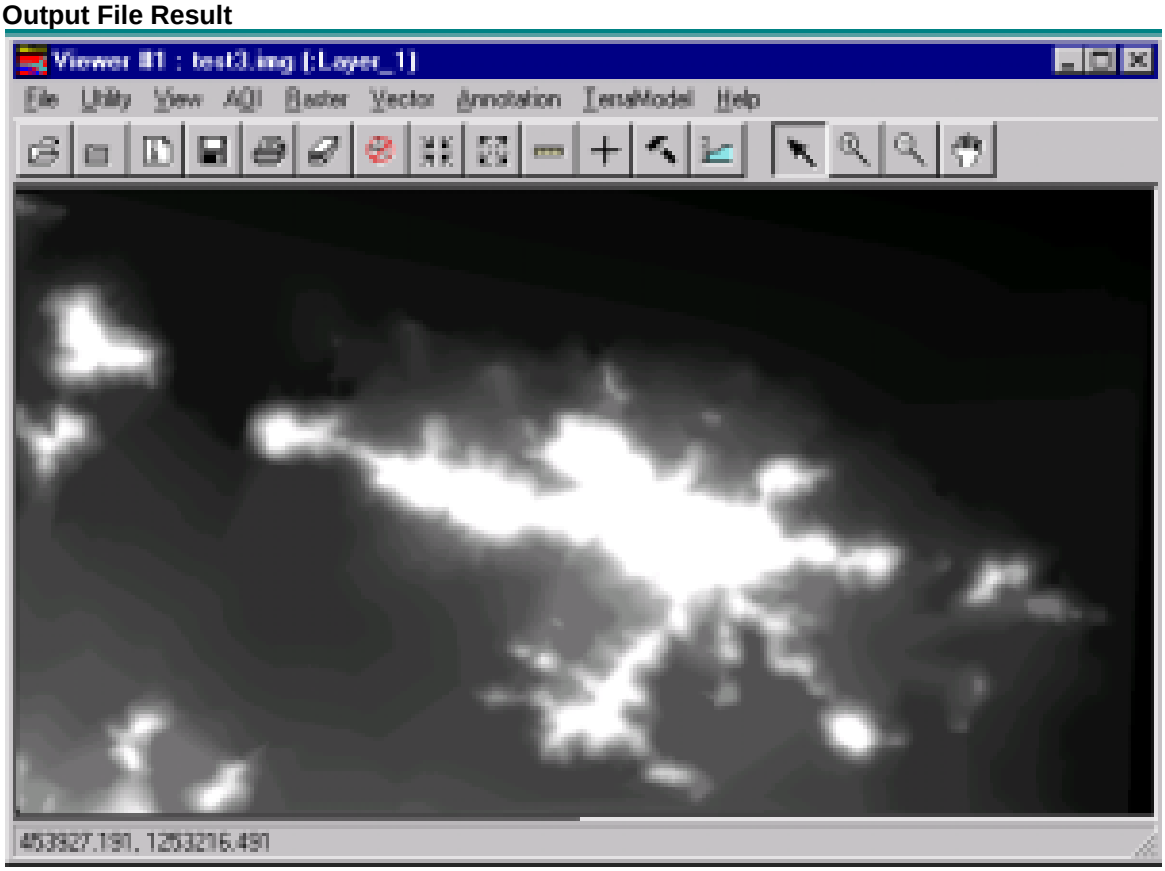


9 *Clicl* ***OK*** *for running surfacing*

Figure 6-8 **Running Surfacing**

10 Open the Output File resulted from Surfacing Method

Figure 6-9 Output File Result



7. TOPIC 7 SPOT IMAGE ORTHO-RECTIFICATION

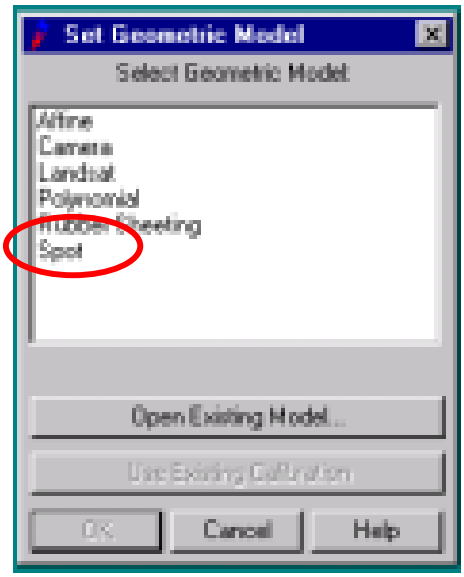
7.1. Data sources:

- SPOT image (Phase I Project)
- Road and River line data as Arc/info coverage
- DEM as created in previous exercise.

7.2. Procedure

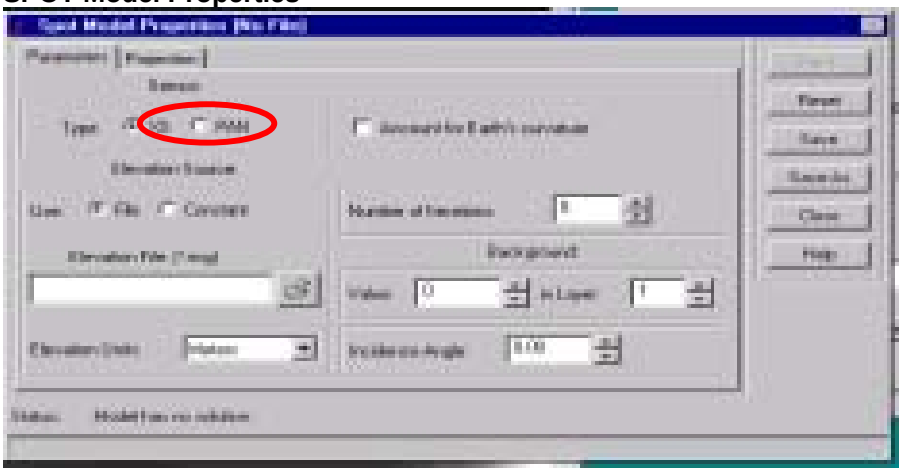
In this case, from the Set Geometric Model window select SPOT and click OK.

Figure 7-1 Set Geometric Model



The result of GCP picked up as in the following table

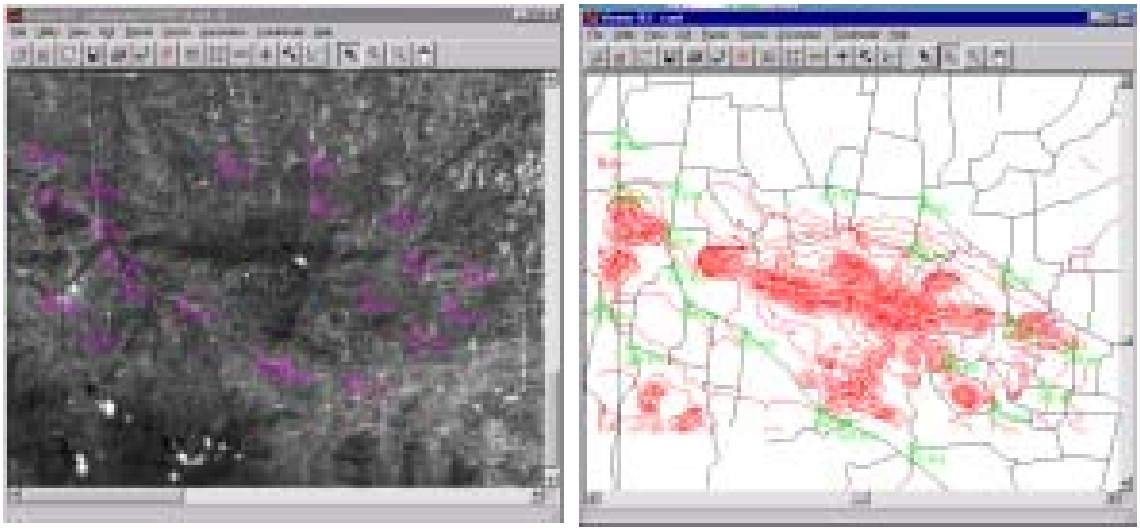
Figure 7-2 SPOT Model Properties



In the above window, select Pan, fill the name of DEM file to be used, incidence angle, and check Account for Earth curvature if need to be considered, and then Click Apply. After that another window will appear from which need to select existing viewer for reference data (which is in this case river/road data of phase 1).

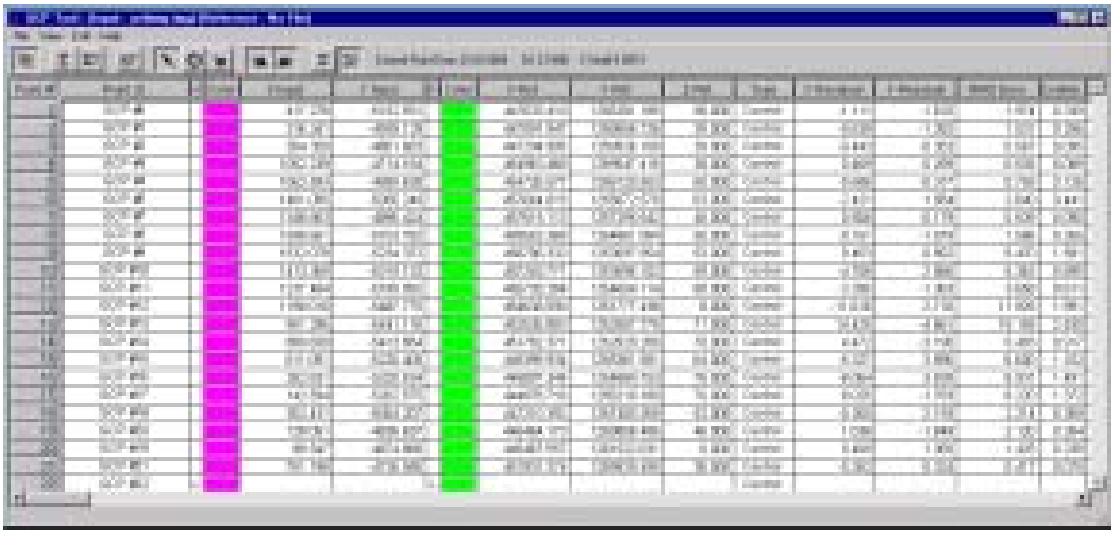
Then, accepting the projection parameters of reference file will display the GCP tool window.

Figure 7-3 **GCP Tool Window**



As shown below, the GCP window for ortho-rectification also includes column with Z-value. This is considered yielding the output image as ortho-rectified.

Figure 7-4 **GCP Tool**



7.3. Result

The resampling process resulted the outputted SPOT image covering the area equal to DEM.

Figure 7-5 Result of Ortho-Rectification