

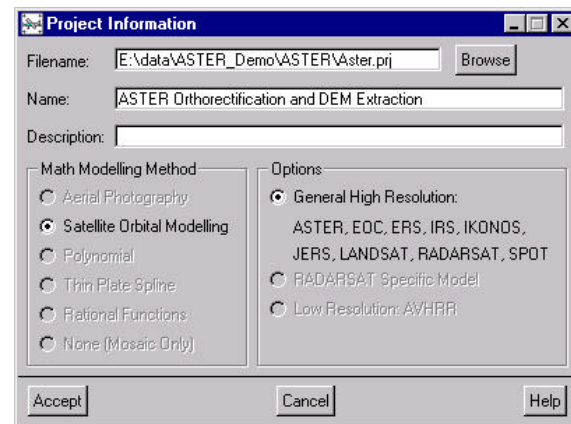
## Geomatica OrthoEngine Tutorial

# Extracting a DEM from ASTER Data

The ASTER Earth Observation Satellite is unique in that it offers nearly simultaneous capture of stereo images, minimizing temporal changes and sensor modeling errors. Band 3 of the VNIR sensor includes two channels, a Nadir looking scene and a Backward looking scene. This provides stereo coverage from which a DEM can be automatically extracted. The following is a brief tutorial on the use of Geomatica OrthoEngine for ASTER DEM Extraction.

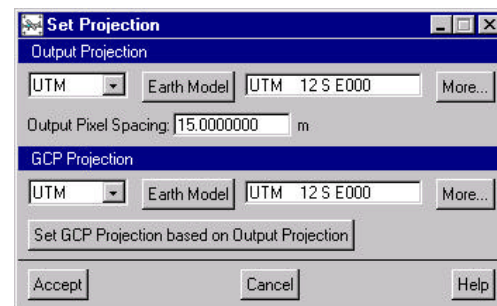
### Step 1:

- Select **File > New** to create a new project in OrthoEngine.
- Enter a Filename and Project Name.
- Select "Satellite Orbital Modelling".
- Select "General High Resolution" model.



### Step 2:

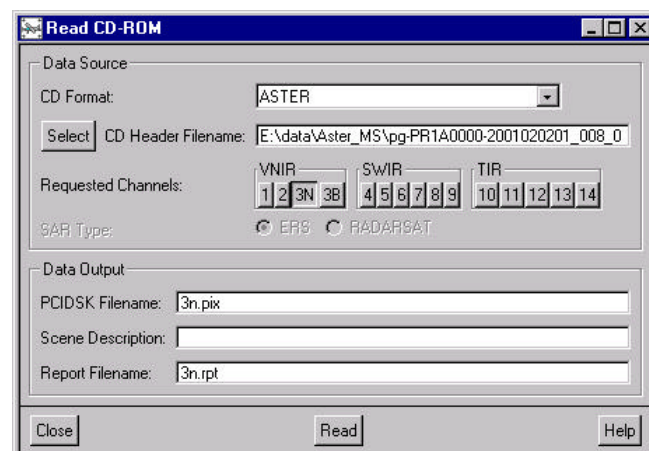
- Set the Project Georeferencing and Output Pixel Spacing. For the VNIR bands of ASTER, this will be 15m.



### Step 3:

- Select the "Data Input" processing step.
- Select **Read from CD**.
- Select "ASTER" as the CD Format. The buttons for the Requested Channels will change to show the ASTER bands.
- Select the HDF file as CD Header Filename.

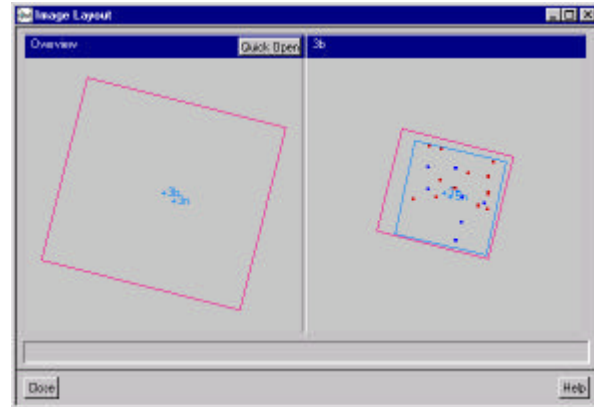
For DEM Extraction, you will require channels 3N and 3B. The nadir and backward-looking channels have different extents and different distortions. This requires them to be georeferenced individually.



- Select the “3N” button, and enter an output filename.
- Click “Read” to import to a .pix database.
- Repeat the steps for the “3B” channel, giving a new filename.

#### Step 4:

- Select the “GCP/TP Collection” processing step.
- Collect GCPs as for any other project, using manual entry, or from geocoded images, vectors, chip databases, or a text file.
- Collect tie points to connect the “3N” and “3B” channels to each other.

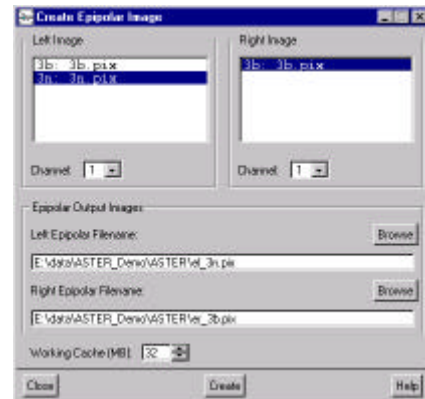


#### Step 5:

- Select the “Model Calculations” processing step.
- Click on the **Perform Bundle Adjustment** icon.

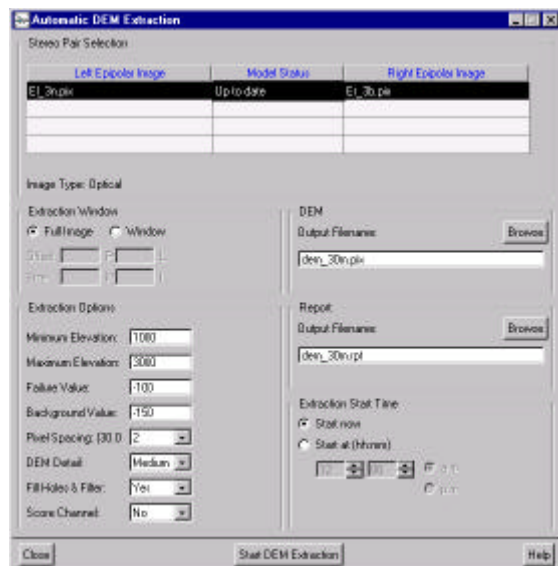
#### Step 6:

- Select the “DEM from Stereo” processing step.
- Select **Create Epipolar Image**.
- In the Left Image window, select the “3N” file. This will move the “3B” file to the Right Image window.
- Select the “3B” file in the right-hand window. The Epipolar Output Image names will be assigned automatically.
- Set Working Cache as desired, and then click **Create**. This resamples the nadir and backward-looking images so that they overlap, left to right, as a stereopair.



#### Step 7:

- Select **Extract DEM Automatically**.
- Select the epipolar pair from the Stereo Pair Selection table.
- Enter a Minimum and Maximum Elevation. For the sample data, enter “1000” and “3000” respectively.
- Select the desired pixel spacing. The resulting ground resolution will be indicated beside the pixel spacing selector. Use “2” pixels for the sample data, for a 30m ground resolution.
- Enter output DEM and Report filenames.
- Click **Start DEM Extraction**.



### Step 8:

- Select the **Geocode Extracted DEM** icon.  
The extracted DEM will be the default Input DEM. The Failure and Background values will be shown.
- Enter an Output DEM filename.
- Specify the Pixel Spacing, which is usually the ground resolution from the previous panel.
- Click on **Geocode DEM**.

### Step 9:

- Select **File > Image View**.
- Select the DEM to review the results.



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For further information on OrthoEngine Satellite Models or Automatic DEM Extraction, please refer to the OrthoEngine Reference Manual.