

Geomatica OrthoEngine v10.2 Tutorial

Orthorectifying TerraSAR-X Data

Radar Specific Modeling

TerraSAR-X, launched on June 15, 2007, is the first commercial German Radar Satellite that offers a radar data of upto 1m resolution. It was implemented within a Public-Private partnership between German Aerospace Center and EADS Astrium. Infoterra GmbH (*an EADS Astrium company*) holds the exclusive commercial exploitation rights for TerraSAR-X (www.infoterra.de).

TerraSAR-X works in X-band and acquires new high-quality radar images of entire planet while circling Earth in a polar orbit. It is designed to carry out its task for five years, independent of weather conditions and illumination, TerraSAR-X reliably provides high quality topographic information for commercial and scientific applications. Users can browse through a selection of free TerraSAR-X data at <http://www.infoterra.de/tsx/freedata/start.php>

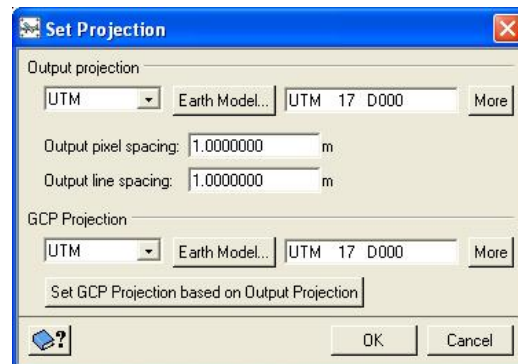
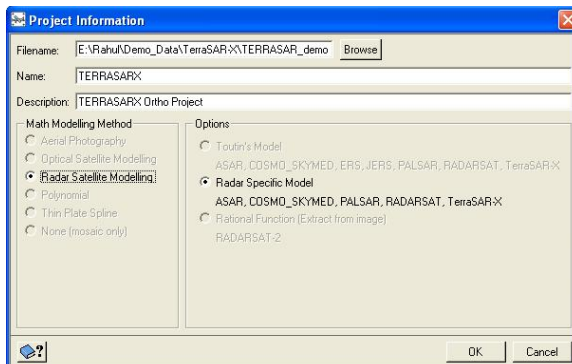
The following tutorial explains the capability of Geomatica OrthoEngine v10.2 to orthorectify TerraSAR-X data. Please note that Geomatica supports only MGD and SSC data types for TerraSAR-X.

1.0 Radar Specific Modeling

OrthoEngine is capable of performing Radar Specific Modeling on MGD and SSC TerraSAR-X data. When working with Radar Specific Model, the inclusion of ground control points (GCPs) is optional. Without any GCPs the model is calculated based on the satellite's positional information. If required, an addition of few GCPs, although not necessary, will refine the model and improve the accuracy. As long as a DEM is included in your project, the images can still be orthorectified without any GCPs.

1.1 Initial Project Setup

Start OrthoEngine and click 'New' on the File menu to start a new project. Give your project a 'Filename', 'Name' and 'Description'. Select 'Radar Satellite Modeling' as the Math Modeling Method. Under Options, select 'Radar Specific Model' option. After accepting this panel you will be prompted to set up the projection information for the output files, the output pixel spacing, and the projection information of GCPs. Enter the appropriate projection information for your project.



1.2 Data Input

You do not need to import TerraSAR-X data into a PIX file using 'Read from CD-ROM' as this type of data is supported directly in the Generic Database Library (GDB). Image can be accessed directly using 'TSX1_*.XML' file at GCP Collection or Ortho Generation Stage.

However you may need to arrange TerraSAR-X raw data in a particular directory structure before reading into Geomatica Ortho Engine. It looks for files in certain directories:

```
Root Directory/  
  TSX-1.SAR.L1B/  
    TSX1_SAR__AAA_BBBB_CC_D_EEE_XXXXXXXXTXXXXX_XXXXXXXXTXXXXX/  
      TSX1_SAR__AAA_BBBB_CC_D_EEE_XXXXXXXXTXXXXX_XXXXXXXXTXXXXX.xml  
        ANNOTATION/  
        IMAGEDATA/  
        PREVIEW/  
        AUXRSTER/  
        SUPPORT/
```

Detailed information (with File Name, File Type etc.) is available in general Geomatica Help.

1.3 GCP Collection

At this stage an ortho image can be generated directly in the absence of any GCPs. The model will be computed based satellite positional information.

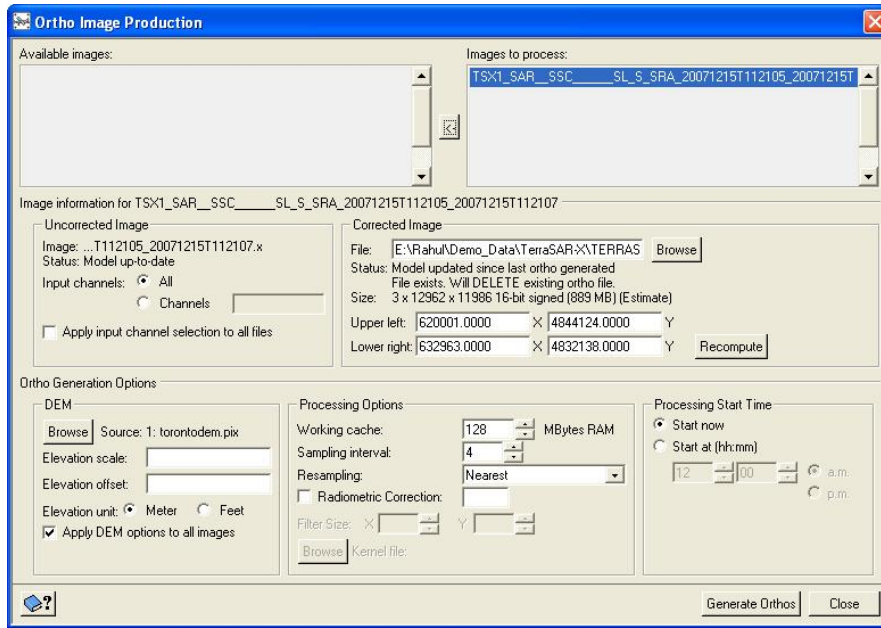
If GCPs are available, they can be added into the project using GCP/TP Collection processing step. The model can be automatically computed (using Compute Model option), and GCPs can be reviewed through Residual report.

Note: If you have 8 or more GCPs, you can setup your project using Toutin's model.

1.4 Ortho Generation

Proceed to 'Ortho Generation' processing step and click on 'Open an Image' button. Point to 'TSX1_*.XML' file and click open. XML file will get listed as an Uncorrected File in the Open Image box. TerraSAR-X data is fully supported in GDB.

Click on 'Schedule Ortho Generation' button to prepare for TerraSAR-X orthorectified image generation. Select the file to be processed and select an appropriate DEM file. Set other processing options before generating the final ortho image.



The final TerraSAR-X orthorectified image (.pix format) can be accessed in Focus or Ortho Engine viewer.

