

Geomatica OrthoEngine v10.2 Tutorial

Orthorectifying COSMO-SkyMed Data

Radar Specific Modeling

COSMO-SkyMed (*Constellation of Small Satellites for the Mediterranean basin Observation*) is a constellation of FOUR multi mode high resolution Synthetic Aperture Radar satellite systems by Italy (ASI/IMOD). COSMO 1, 2 and 3 were launched on June 8, 2007, December 9, 2007 and 25 October, 2008. COSMO-4 launch is expected in 2010 from Vandenberg Air Force Base station. The expected operating life of each satellite is estimated as 5 years.

In SPOTLIGHT mode, COSMO-SkyMed is capable of producing data of 1 X 1 m² resolution. The system monitors entire globe and Mediterranean area in particular providing information for a number of applications. The main objectives of the system are controlling national territory and monitoring environmental disasters such as flood and landslides, monitoring coastlines, seas and internal waters; agriculture monitoring and cartography with images of 1 m resolution. Italian Space Agency (ASI) and Italian Ministry of Defense (IMOD) are official COSMO-SkyMed data distributors.

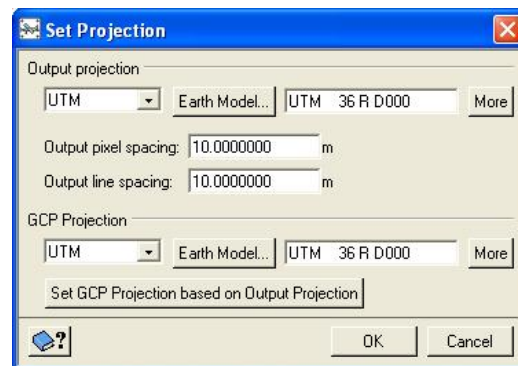
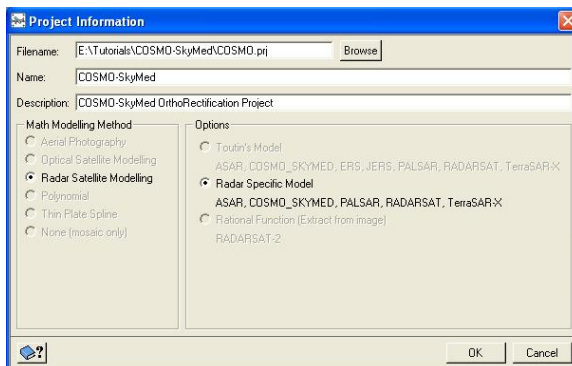
The following tutorial explains the capability of Geomatica OrthoEngine v10.2 to orthorectify COSMO-SkyMed data. Please note that Geomatica Ortho Engine supports Level 1A (SCS) and Level 1B (MGD) COSMO-SkyMed SAR Standard Products where Geomatica Focus supports all type of Standard COSMO-SkyMed products.

1.0 Radar Specific Modeling

OrthoEngine is capable of performing Radar Specific Modeling on both L1A and L1B COSMO-SkyMed SAR Standard 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

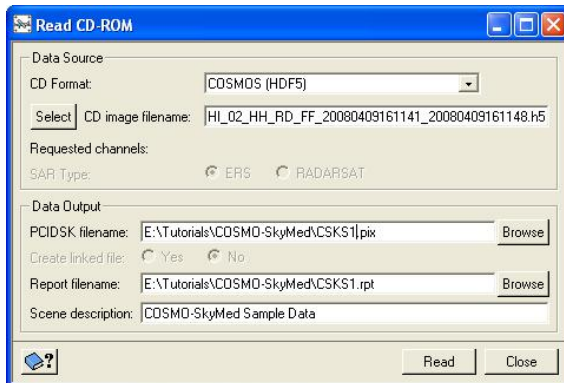
Start OrthoEngine and click 'New' on the File menu to start a new project. Give your project a 'Filename', 'Name' and 'Description'. Select 'Radar Satellite Modeling' as the Math Modeling Method. Under Options, select 'Radar Specific Model' option. After accepting this panel you will be prompted to set 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

Select 'Data Input' option from 'Processing Step' drop down and click on 'Read CD-ROM data' button
(Please note that we are treating this data as if it is on CD-ROM, even though it is actually located on the hard disk)

Choose 'COSMOS (HDF5)' as the 'CD Format' and select your H5 image file. Specify an appropriate output 'PCIDISK filename', a 'Scene description', and a 'Report filename'. This step will convert the source file to '.pix' format, and add the orbital information needed for modeling.



NOTE: In Geomatica v10.3, COSMO-SkyMed data will be fully supported in Generic Database Library (GDB) and user will not need to perform the Data Input step.

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 'Schedule Ortho Generation' button to prepare for COSMO-SkyMed 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.

