Satellite Orbital Models ProPack

SATELLITE ORBITAL MODELS PROPACK

Extend the functionality of the PCI ProSDK through the Satellite Orbital Models ProPack. The Satellite Orbital Models ProPack enables flexible use and automation of PCI Geomatics' robust, model-based satellite orthorectification technology.

The Satellite Orbital Models are rigorous models developed to compensate for distortions and produce orthorectified satellite images. These models take into account the platform position, velocity, and orientation, the sensor orientation, integration time, and field of view, the Earth representation (geoid, ellipsoid, and relief), and the output cartographic projection

The Satellite Orbital Models ProPack support a wide range of optical, SAR, and low-resolution satellite sensors:

Optical Sensors

- ASTER:
  - Level 1A format (recommended)
  - 1B HDF format
- CBERS
- EOC
- EROS Level 1A
- FORMOSAT Level 1A
- IRS Super Structure (recommended):
  - Level 0
  - Level 1
- IRS (EOSAT):
  - IRS full-scene data
  - ORBIT-ORIENTED or MAP-ORIENTED product
- LANDSAT 5 (Brazilian):
  - Full-scene data with level 4 or 5 processing levels
- LANDSAT 5 (EOSAT):
  - LANDSAT 5 image full-scene data
  - ORBIT-ORIENTED or MAP-ORIENTED product
  - SYSTEMATIC geodetic processing
- LANDSAT 5/7 (LSGOWG) Canadian CDs:
  - LANDSAT full-scene or sub-scene image data
  - Level-4 processing (bulk, radiometric, and along-scan-line geometric corrections applied)
  - Level-5 processing (georeferenced) CD
- LANDSAT 5/7 (LSGOWG) ESA CDs:
  - Level 5 full-scene or quad–scene data
- LANDSAT 5 (NLAPS, TIFF):
  - NLAPS full-scene data with level-8 processing levels
  - TIFF full-scene data with systematic correction
- LANDSAT 7 (HDF, TIFF, FAST, NLAPS):
  - Full-scene data with 1G progressing in HDF, TIFF, FAST, or NLAPS format
  - 0R or 1R is not recommended because of discontinuity on the image
- MERIS 1B format
- SPOT 1 to 3 (LGWOWG) Canadian formats, Level 1
- SPOT 1 to 4 (SPOTIMAGE)
  - Level 0
  - 1A (recommended)
  - 1B
  - Old SPOTIMAGE LGSOWG format and the new CAP-T format
- SPOT 5 (TIFF)
  - Level 1A SPOT 5 Dimap format

Radar Sensors

- ASAR
  1B format
- RADARSAT:
  - SGC (SAR Georeferenced Coarse Resolution)

  - SGF (SAR Georeferenced Fine Resolution)
  - SGX (SAR Georeferenced Extra-Fine Resolution)
  - SLC (Single-Look Complex)
  - SCN (ScanSAR Narrow-Beam Product)
  - SCW (ScanSAR Wide-Beam Product)
- ERS:
  - Georeferenced level for images produced in Canada
  - PRI level produced by ESA
- JERS:
  - Georeferenced level for highest accuracy
  - OrthoEngine only works for descending-order images

Low-Resolution Sensor

- AVHRR

The Satellite Orbital Models ProPack consists of core Pluggable Functions (PPFs) for computing models for optical, SAR, low-resolution optical images (SATMODEL, RSMODEL, and AVMODEL, respectively), plus other PPFs that provide complementary operations as described below.

SOME OF THE INCLUDED COMPLEMENTARY PPFs

Image Import

- CDCBERS
  - Imports image and geometric data from CBERS data products.
- CDEOSAT
  - Imports image and satellite path data from LANDSAT TM and INDIAN IRS data distribution files in EOSAT fast format.
- CDEROS
  - Imports image and satellite path data from EROS CD
- CDFORMOSAT
  - Imports image and geometric data from FORMOSAT data products.
- CDIRSS
  - Imports image and satellite path data from an IRS data distribution files in Super Structure format.
- CDSAR
  - Imports image and satellite path data from ERS and RADARSAT data distribution files in CEOS format.
- CDLAND7
  - Imports image and satellite path data from LANDSAT 7 data distribution files in HDF, TIFF, Fast, and NLAPS format.
- CDLANDB
  - Imports LANDSAT TM from Brazilian CEOS format
- CDMERIS
  - Imports image and satellite path data from ENVISAT MERIS data distribution files.
- CDMODIS
  - Imports image and satellite path data from MODIS data distribution files in HDF format.
- CDASAR
  - Imports image, radiometric calibration, and satellite path data from ENVISAT ASAR data distribution files.
- CDASTER
  - Imports image and satellite path data from ASTER data distribution files in HDF format.
- CDSPOT
  - Imports SPOT imagery from SPOTIMAGE LGSOWG format

- CDSPOT5
  - Imports image and satellite path data from SPOT DIMAP format CD.
- CDJERS1
  - Imports JERS-1 SAR imagery from LGSOWG CCT format
- CDNLAPS
  - Imports LANDSAT TM imagery from NLAPS (NDF) format

Image Preparation

- ORBITRD
  - Copies orbit data from a text file to a orbit segment in a PCIDSK.
- ORBITWR
  - Copies orbit data from an orbit segment in a PCIDSK file to a text file.
- STITCH
  - Merges orbit-adjacent IKONOS, QuickBird, ASTER or SPOT images into a single image that has valid ephemeris data.

Ground Control Point (GCP) and Tie Point (TP) Management

- GCPEXPORT
  - Exports ground control points from a project file into a GCP segment in a PCIDSK file.
- GCPIMPORT
  - Imports GCP data from a GCP segment in a PCIDSK file into an OrthoEngine project file.
- GCPREAD
  - Imports ground control point data from a text file into a GCP segment in a PCIDSK file.
- GCPWRIT
  - Exports ground control point data from a GCP segment in a PCIDSK file to a text file.
- GCPPRO
  - Converts input ground control points (GCPs) to the specified output units.
- GCPELEV
  - Obtains elevations for GCPs from a DEM.
- TPIMPORT
  - Imports tie point data from a text file into an OrthoEngine project file.
- TPEXPORT
  - Exports tie point data from an OrthoEngine project file to a text file.

Digital Elevation Model (DEM) Creation

- VDEMINT
  - Generates a raster DEM from elevation data in vector layers and observes 2D breakline constraints.
- NNINT
  - Generates a raster DEM from spot elevations read from a raster, using natural neighbour interpolation.

DEM and Vector Elevation Reference Transfer

- DEMZREF
  - Transforms raster DEM elevation values from mean sea level to ellipsoidal.
- VECZREF
  - Transforms 3D vector elevation values from mean sea level to ellipsoidal.

Adjustment

- OEMODEL
  - Evaluates a block adjustment for a set of images in a project file and generates math model segments for each image.

Image Management

- IMERGE
  - Merges multiple geocoded rasters into a single file.
- REPROJ
  - Reprojects images, bitmap segments and vector layers to a specified projection.
- CLIP
  - Clips layers based on a user defined clip region.
- TILE
  - Creates multiple subset tiles from a single file.
- PYRAMID
  - Builds an image pyramid for one or more image layers in a data file.

For more information, contact

PCI Geomatics
50 West Wilmot Street
Richmond Hill, ON L4B 1M5
Canada

Phone: 1 905 764 0614
Fax: 1 905 764 9604
Email: info@pcigeomatics.com
Web: www.pcigeomatics.com