

Pan Sharpening

The PANSHARP algorithm applies an automatic image fusion that increases the resolution of multispectral (color) image data by using a high-resolution panchromatic (black and white) image. Most Earth resource satellites, such as SPOT, IRS, Landsat, IKONOS, and Quickbird, provide multispectral images at a lower spatial resolution and panchromatic images at a higher spatial resolution. This allows you to easily fuse images acquired simultaneously by the same sensor. Alternatively, you can fuse images from different sensors.

PANSHARP works with 8-bit, 16-bit, and 32-bit real data types.

Module Prerequisites

Pan Sharpening is an add-on to Geomatica. It requires Geomatica Core or Geomatica Prime as a prerequisite.

PANSHARP Algorithm

The PANSHARP algorithm is based on the least number of squares to an approximate gray-value relationship between the original multispectral image, panchromatic image, and fused image. Using the PANSHARP algorithm, you can:

- Solve color-distortion and operator- or data-dependency problems
- Achieve the best color representation
- Preserve the mean, standard deviation, and histogram shape for each channel
- Fuse all spectral bands of a satellite image with the corresponding panchromatic band at once
- Minimize color distortion, maximize feature detail, and naturally integrate color and spatial features

PANSHARP Input Images

The PANSHARP algorithm requires the following input images:

- Multispectral Image Layers:
 - Color layers that will be fused with a high-resolution panchromatic image layer
- Reference Multispectral Image Layers:
 - Aid in the pan-sharpening process
 - Span the same frequency range as the panchromatic image layer
 - Vary from sensor to sensor
- Panchromatic Image Layer:
 - The high-resolution grayscale layer used to pan-sharpen the multispectral image layers



PANSHARP OPTIONS

The PANSHARP algorithm offers:

- Enhanced pan sharpening can generate a refined pan-sharpened output image:
 - “Yes” option generates a refined pan-sharpened output image (more suitable for visualization or visual interpretation purposes)
 - “No” option generates a standard pan-sharpened output image (more suitable for digital classification purposes)
- No-data image value:
 - Specifies a background value for all layers
- Pyramid options:
 - Specifies the type of resampling to use when computing overview levels (nearest neighbor, average, or mode)

For Best Results

When using the PANSHARP algorithm, it is recommended that you:

- Use multispectral-image channels whose wavelengths lie within the frequency range of the panchromatic image channels
- Do not exceed a resolution ratio of 5:1 (e.g. 5m color, 1m grayscale)
- When working with satellite data, use the GRNEHN algorithm as a post-processing step after running the PANSHARP algorithm

For improved performance when Pan sharpening, use the OpenMP enabled version of PANSHARP

- PANSHARP2

NOTE: The Pan Sharpening technique was originally developed by Professor Yun Zhang, from the University of New Brunswick.

For more information, contact

PCI Geomatics
90 Allstate Parkway, Suite 501
Markham, ON L3R 6H3
Canada

Phone: 1 905 764 0614

Fax: 1 905 764 9604

Email: info@pcigeomatics.com

Web: www.pcigeomatics.com