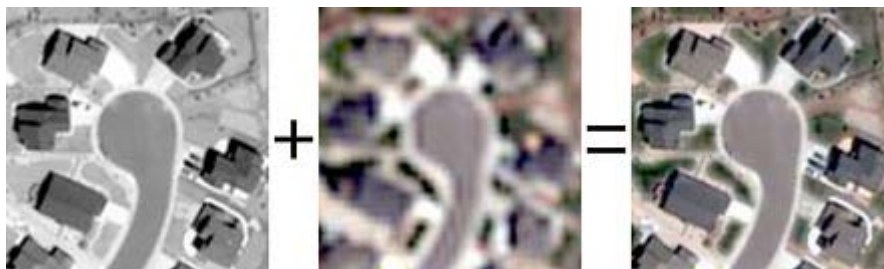


TUTORIAL

Geomatica's pan sharpening algorithm fuses the high-resolution panchromatic and low-resolution multi-spectral imagery together to create an enhanced high-resolution color image. The high-resolution color image preserves the original color fidelity and allows for better visualization and interpretation.

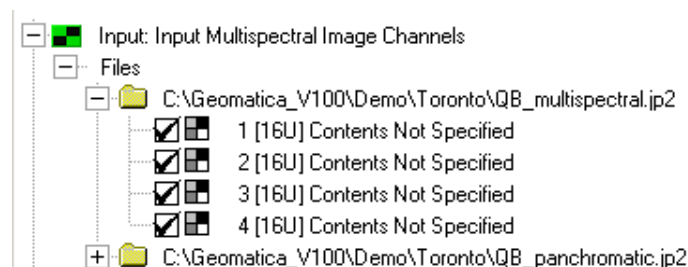
Panchromatic data can be fused with multi-spectral imagery acquired simultaneously by the same sensor, or images from different sensors can be used. However, the best results will be achieved when the imagery is collected simultaneously and the resolutions of the panchromatic and multi-spectral data are closely matched. The spectral characteristics of the original data will be preserved in the resulting high resolution color imagery. This means that analysis such as classification can be done on the pan-sharpened imagery with the added benefit of higher spatial resolution.



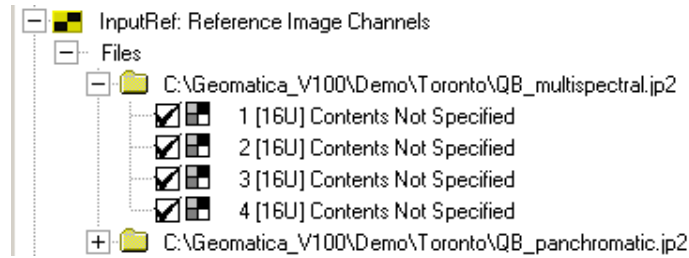
PANSHARP is an add-on feature that requires Geomatica Prime to operate and it is available from EASI, Focus (Algorithm Librarian) or the Modeler environment. This example demonstrates the Focus method using demo data installed from the PCI Geomatica install CD.

To create a Pansharpened Image:

1. The first step is to ensure that all of the panchromatic channel and the multi-spectral image channels are co-registered (geocorrected or orthorectified).
2. Locate and open the PANSHARP panel
3. From within the Files tab of the PANSHARP panel click the Browse button to locate the input files if they have not yet been already loaded into the Focus viewer window.
4. In the Input Ports section select the multi-spectral image channels to be included in your output image. (Note: The order that you check the boxes of the multi-spectral image channels is important and will effect the output results. For example selecting channel 3 first will result in that image data being used to create the first image channel of your output image).



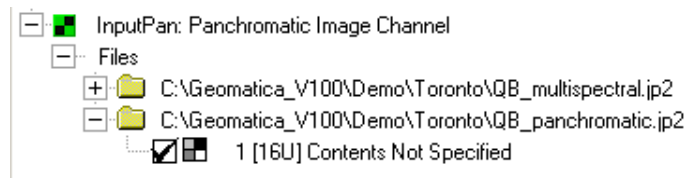
- Select the input reference image channels for the type of data that you are using and should be selected so that the ms bands cover the frequency range of the panchromatic channel as closely as possible. The order of the reference channels doesn't matter.



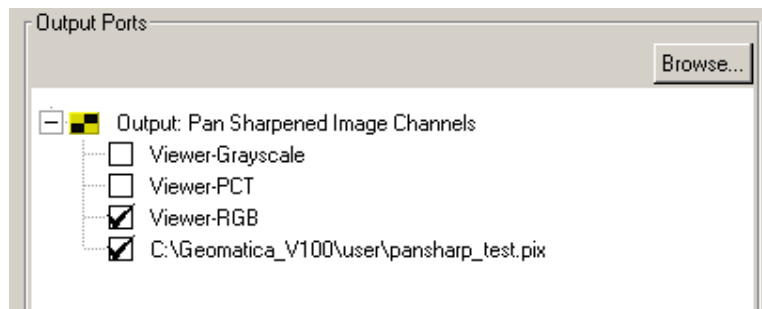
The following table is a list of the reference bands for some well-known satellite sensors:

Sensor:	Reference Bands			
Landsat 7 (ETM+)		Green: 2	Red: 3	Near IR: 4
SPOT 1, 2, 3 (HRV)		Green: 1	Red: 2	
SPOT 5 (HRG)	Blue: 1	Green: 2		
IRS 1C, 1D		Green: 1	Red: 2	
IKONOS	Blue: 1	Green: 2	Red: 3	Near IR: 4
QuickBird	Blue: 1	Green: 2	Red: 3	Near IR: 4

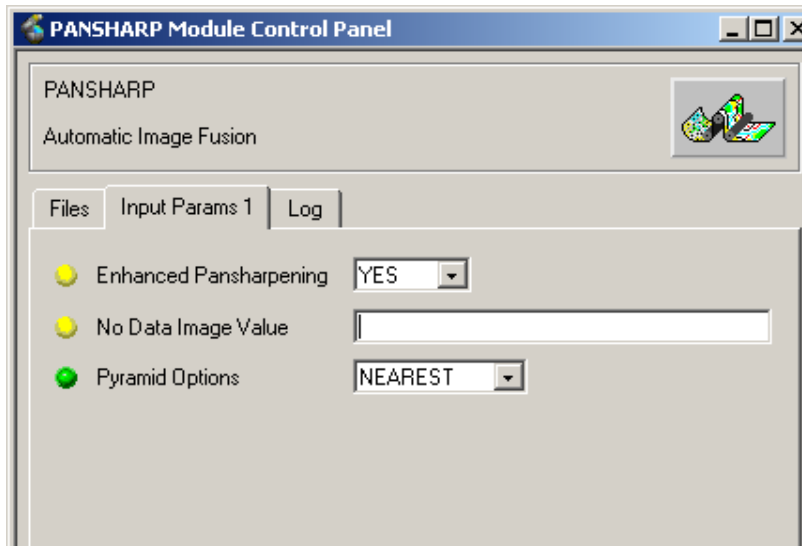
- Select the panchromatic data channel in the Input Ports section of the window.



- In the Output ports section select your output option by either using the browse option to specify a file name and path for your output image, sending it to the Focus viewer or both.



- There are some optional parameters found under the Input Params 1 tab of the PANSHARP panel. These options allow you to choose to generate a refined output image, have a No Data value associated with your data and allow you to specify the type of resampling that will be used when computing the overview levels of the data.



- When all parameters and image channels have been selected, click the **Run** button to begin the process.

The automatic image fusion algorithm was developed by Dr. Yun Zhang from the University of New Brunswick. For more information and comparative results see the below references:

- Zhang, Yun. Problems in the fusion of commercial high-resolution satellite as well as Landsat 7 images and initial solutions. ISPRS, Vol. 34, Part 4, "GeoSpatial Theory, Processing and Applications", Ottawa, 2002.
- Zhang, Yun. A new automatic approach for effectively fusing Landsat 7 as well as IKONOS images. IEEE/IGARSS'02, Toronto, Canada, June 24-28, 2002.