

# Satellite Imagery Glossary

## Archive/Fresh Capture

Each Satellite supplier provides an imagery archive from which customers can purchase imagery that has already been captured. This allows Geoimage to source through the available imagery to find imagery that most suits the client's needs.

However, if there is not suitable archive imagery available, then the satellite needs to be programmed for Fresh Capture. This option is more expensive than purchasing archive data, however it does supply the client with the most recent imagery possible.

**NOTE:** All satellite suppliers stipulate a minimum cloud cover limitation. Any fresh capture imagery that contains cloud less than the stated percentage must be purchased. This limitation does not include haze, smoke, high-level cloud or cloud shadow.

## Bundle

Satellite imagery is provided in a few different band configurations. The most popular configuration is known as bundle. A bundle product is supplied as a panchromatic/multispectral combination. By purchasing bundle imagery, the client receives the multispectral imagery in its native resolution which allows for more accurate spectral analysis. Geoimage can then use the panchromatic band to pansharpener the imagery (see below).

Other configurations include:

- Panchromatic only,
- Multispectral only, and
- Pansharpener Multispectral

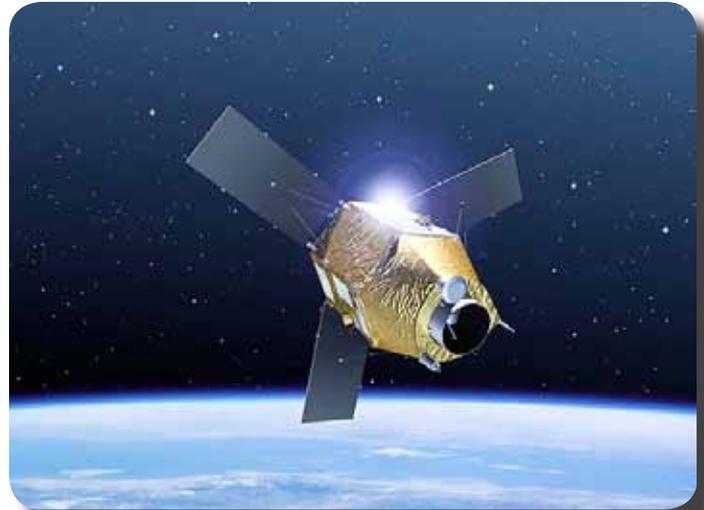
## Datum and Projection

To enable Geoimage to provide the most useful product, the required Datum/Projection must be specified. Given the large spatial differences between datum/projections (e.g a 200m difference between WGS84 and AGD66), it is essential that we are provided with the correct information.

The most common world-wide datum projection is WGS84/UTM which is what Geoimage will provide if not stated otherwise within the acceptance form.

For further information regarding datum/projections please follow the link:

<http://www.icsm.gov.au/mapping/datums2.html>



## Pansharpener

Typically, satellite imagery is captured in two modes, a higher resolution panchromatic mode along with a simultaneous capture of a multispectral dataset at a lower resolution. e.g. GeoEye-1 captures panchromatic at 50cm resolution and multispectral data at 2m resolution.

Pansharpener is a process where the two datasets are merged to produce a higher resolution multispectral imagery. This pansharpener product is extremely useful for visual analysis, mapping, GIS backdrops etc.

Because the data has had additional processing applied to it, during the pansharpener process, it is not recommended to use the pansharpener multispectral dataset for higher-level spectral analysis techniques.

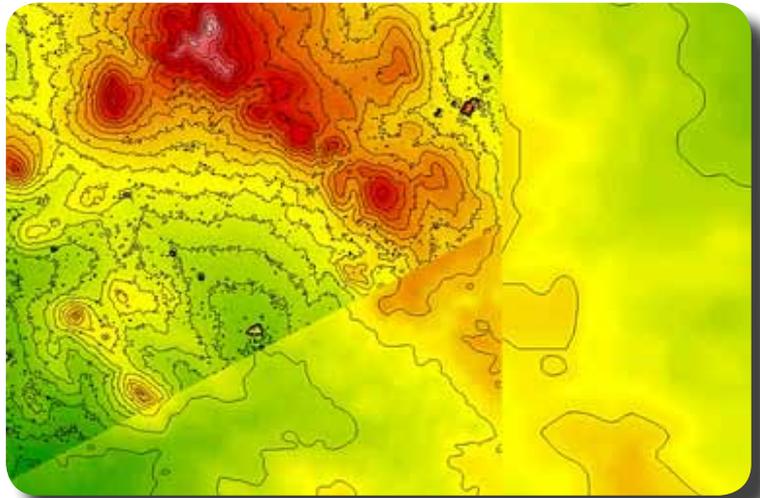


# DEMs – Digital Elevation Models

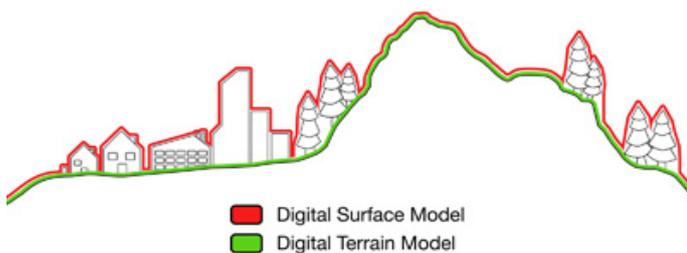
The term DEM is a generic term that includes two distinct topographic models and it is important to recognise the distinction as it will affect how useful the model is for any application.

A Digital Surface Model (DSM) is an elevation model of surface reflectance features and includes the heights of cultural features such as buildings, road and vegetation as well as bare earth.

A Digital Terrain Model (DTM) is a bare earth model in which all the cultural features have been removed. Geoimage is usually not able to provide a DTM option for DEM products that include heavily vegetated areas (closed canopy) or urban areas.



*Digital Elevation Examples*



## Enhanced vs unenhanced

Geoimage typically provides satellite imagery in two forms, enhanced and unenhanced.

Enhanced imagery involves a process of adjusting and/or altering the dynamic range of the dataset to produce a visually pleasing image. This process can also include the provision of an enhanced natural colour image (trees are greener) or a false colour enhancement, that emphasises vegetation health. Typically these datasets are provided in a compressed format, allowing for easy use within software packages.

Unenhanced imagery is the "true" data, with untouched dynamic range information. These datasets are required for spectral analysis. These datasets are typically provided in an uncompressed digital image format. Geoimage needs to be informed if these datasets are required.

## Formats

Geoimage is able to provide satellite imagery in a wide variety of data formats. It is important to let us know what format you are using, or what software package you are operating. This will allow us to generate a product that is suitable for your use.

Additionally, if there are specific additional files required with the data - such as MapInfo TAB files - we are able to provide these.

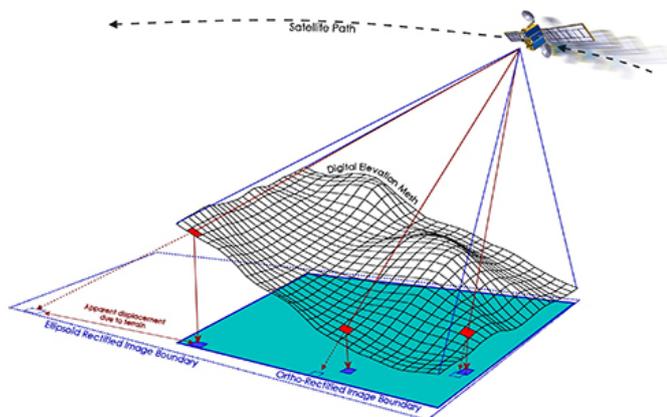
Most commonly used image formats include (but are not restricted to):

- ERMapper BIL - uncompressed format
- ERMapper ECW - compressed format
- GeoTIFF - uncompressed format, provided with associated world files.
- JPG2000 - compressed format
- Imagine IMG - uncompressed format (usually) with associated support files
- NITF 2.0/2.1 - uncompressed format



*Enhanced vs unenhanced*

# Processing Levels



Geometric rectification improves the horizontal positional accuracy of the imagery by warping the imagery to match the client's vectors or accurate ground control and is suitable where the area is largely flat and the imagery has been acquired from nadir (near vertical) viewing. For areas where there is undulating topography, or the imagery has been acquired at a high angle to the vertical, or very high accuracy is required, orthorectification is necessary.

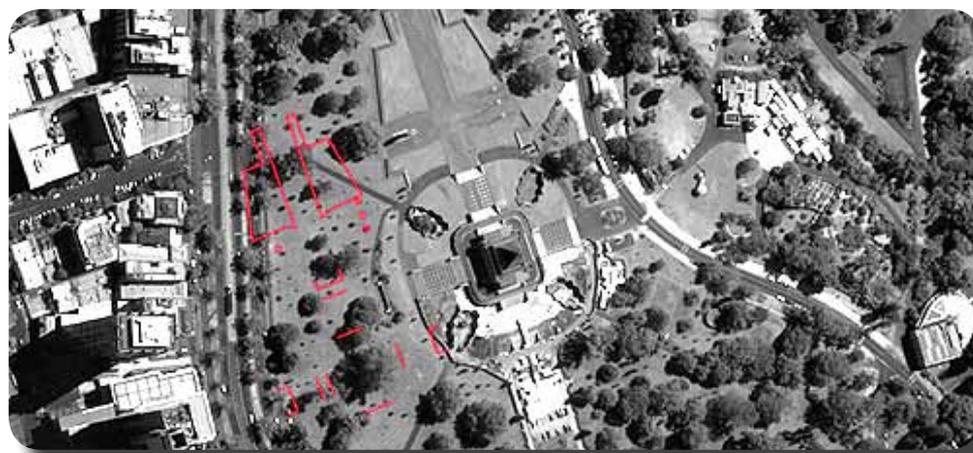
Orthorectification is also usually required if several images or scenes need to be mosaicked in order to ensure that the joins are seamless.

All Geoimage products have been subjected to one of three processing levels. These levels are directly related to the level of geometric accuracy required by the client. The three different levels are:

## Processing Level 0

This processing level **does not** include any orthorectification and is the minimum level of processing of data provided by Geoimage. Processing includes verifying the imagery covers the ordered polygon and is correct in terms of resolution and data type. Positional accuracy of the data is as per the accuracy of the data quoted by the data provider, and is often referred to as "**OrthoReady**" or "**Geo**" by data suppliers. Choose this processing level if:

- You will be orthorectifying the data yourself, or
- The data is from an area of low relief and you do not want the data accurately located.

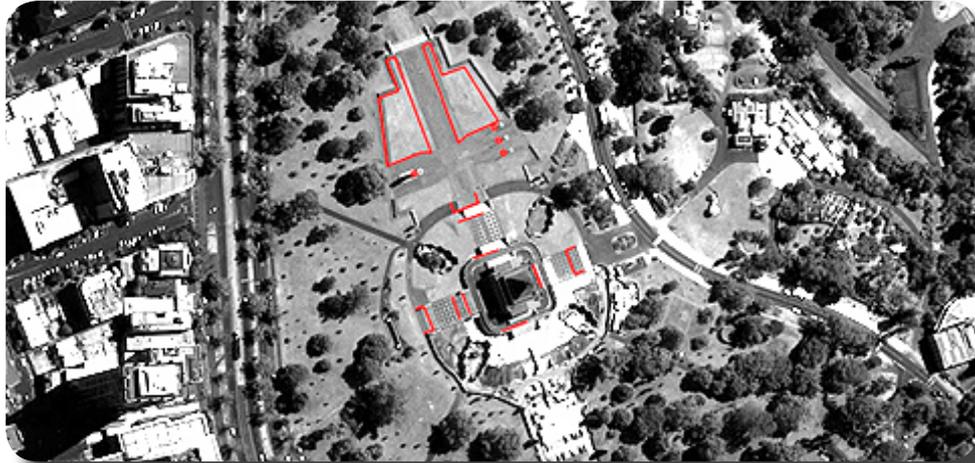


*Raw Imagery - no orthorectification applied*



## Processing Level 1 (Systematic Orthorectification)

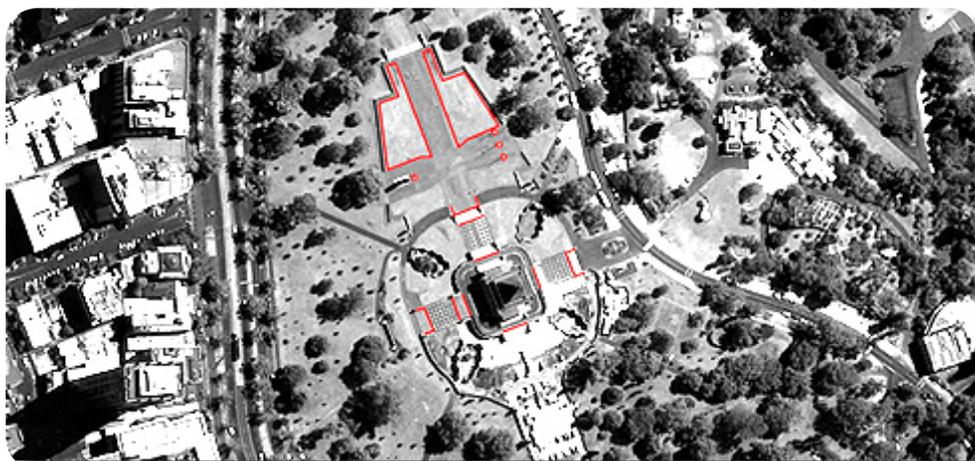
This processing includes systematic orthorectification without ground control and uses the satellite parameters (ephemeris data) and the Shuttle Radar Topography Mission (SRTM) DEM. Because of the variable angles of capture of VHR satellite imagery this processing is considered the minimum requirement for mosaicking of image strips collected on different dates or times and/or for GIS work. Mosaicking of multiple swath data over the polygon purchased is included in this option.



*Level 1 - Systematic Orthorectification applied - accuracy +/- 4m*

## Processing Level 2 (Orthorectification with User-Supplied Ground Control)

This processing includes orthorectification using user-supplied ground control and the satellite parameters. Either the Shuttle Radar Topography Mission (SRTM) DEM or a user-supplied DEM more detailed than the SRTM DEM may be used with this option. Note that the user-supplied ground control and/or DEM is to be supplied up-front i.e. prior to any processing. This option may include supply of the non-orthorectified digital data in a format suitable to the client's software. Mosaicking of multiple swath data over the polygon purchased is included in this option.



*Level 2 - Orthorectification applied - accuracy <1m*

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