ERDAS IMAGINE

MODULAR TRAINING

APRIL 2023

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Contents

ERDAS IMAGINE TRAINING
AT GEOSPATIAL INSIGHT

Geospatial Insight are pleased to offer a suite of modular training packages for Hexagon Geospatial's ERDAS IMAGINE.

The module content is set out over the following pages. In general, the modules are more advanced the further down the list you go and, if you are new to the software, it would be best to take some basic modules before, say, diving into Deep Learning. Modules with an asterisk (*) are essential for successful completion of other modules.

Our Certified Trainers have over 30 years' experience delivering ERDAS IMAGINE training courses worldwide. Our specialism is working with clients to develop tailored courses appropriate to their training needs and we are happy to discuss your requirements and help you tailor a course that meets your needs. We deliver sustainable training solutions by ensuring the data used and the practical skills training extend beyond current requirements to meet the demands of the future.

Our training day generally runs from 10am through to 4.30pm with an hour for lunch and regular breaks throughout the day. Below each module is allocated a number of units. We plan to fit in around eight units per day, although this does vary somewhat based on the number and experience of the attendees. Online training also tends to reduce the number of units that can be successfully achieved per day.

We want you to get the most value you possibly can from our training. We are more than happy to customise the modules, for you to use your own data or devise a completely bespoke training course – just get in touch with us to discuss your requirements.

For more information, contact us at help@geospatial-insight.com

1 INTRODUCTION TO ERDAS IMAGINE AND USING THE VIEWER*

(3 units)

In this section, you will use the Viewer to visualize various types of raster data. The focus will be on displaying and manipulating raster data using the Viewer tools. This section will also look at other tools available in the ERDAS IMAGINE icon panel and how to customize your workspace by setting preferences.

2 USING BAND COMBINATIONS AND INDICES*

(2 units)
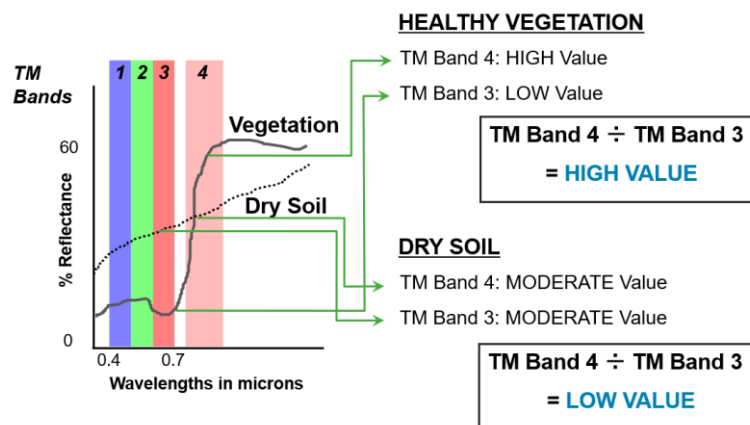
This section will demonstrate the advantages of using different band combinations. Additionally, you will look at some basic methods of applying Raster Algebra using a near infra-red band. You will also get your first glimpse of the Spatial Modeler.

3 UNDERSTANDING SPATIAL MODELS*

(1 unit)

This section will introduce students to the ERDAS IMAGINE Spatial Modeler – the processing core at the heart of ERDAS IMAGINE. This section provides an overview and the chance for you to create your first Spatial Model.

4 CUSTOMIZING IMAGINE

(1 unit)

You will learn how to customise IMAGINE in order to improve usability. Customisable options such as: My Workflow Tab; Layouts; Quick Bar Access; Smart Controls; and customising the Ribbon will be demonstrated. IMAGINE can incorporate many tasks,

which can include customised datasets. You will learn how to customise the IMAGINE interface to improve usability and thus productivity.

5 IMPORTING AND REPROJECTING DATA

(1 unit)

You will use the Import Tool to utilise the freely available Landsat-8 imagery available via the USGS website. This tool imports a tar.gz, unzips the data, selects the relevant bands, and then stacks the band creating a single image/s output to be used directly in ERDAS IMAGINE processing packages.

6 SPATIAL ENHANCEMENT
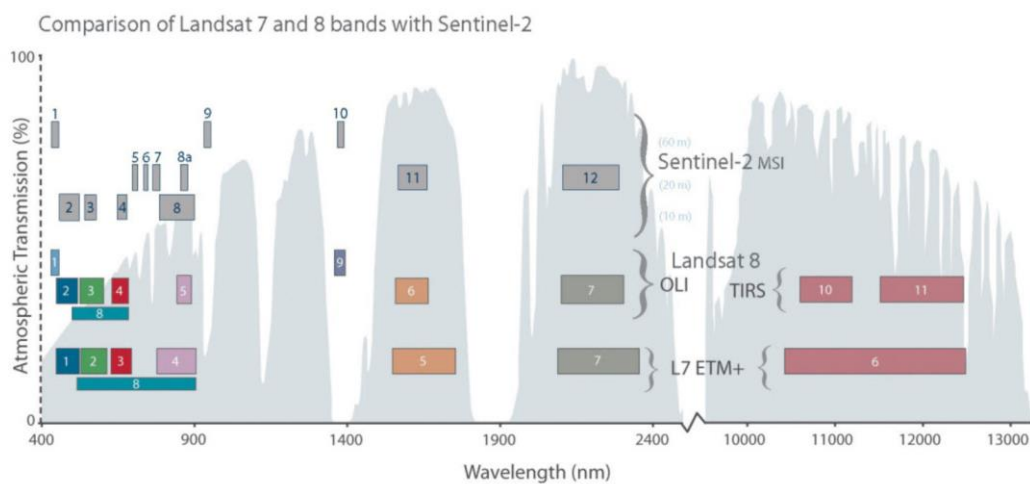
(1 unit)

Spatial Enhancement can be a powerful tool. This Section will review a few of the many Spatial Functions available within IMAGINE; for example, Resample Pixel Size and Pan Sharpening.

7 SPECTRAL CHARACTERISTICS

(1 unit)

This section will introduce you to the wide range of tools available within IMAGINE for viewing, analysis and interpreting Spectral Characteristics of images.

8 SUBSETTING AN IMAGE

(1 unit)

This section will introduce you to a multitude of approaches for subsetting. A subset using an active AOI layer on screen will be used. The steps to create and define shapefile attributes will also be covered. This will provide a starting point to lead into subsetting by shapefile attributes using the MosaicPro Tool.

9 SUPERVISED CLASSIFICATION

(3 units)

Signature Collection is the first step in Supervised Classification. The resulting signature set will be evaluated in the next task and utilised during Supervised Classification. Unlike the process of Unsupervised Classification, which will be briefly covered here, the user creates the class type inputs which are used to 'train' the classifier to recognize features with different spectral characteristics. You will learn how to perform a supervised classification by collecting sets of pixels to define spectral signatures. Then, you will evaluate the accuracy of those signatures and use them to classify an entire image.

10 MOSAICS IN IMAGINE

(2 units)
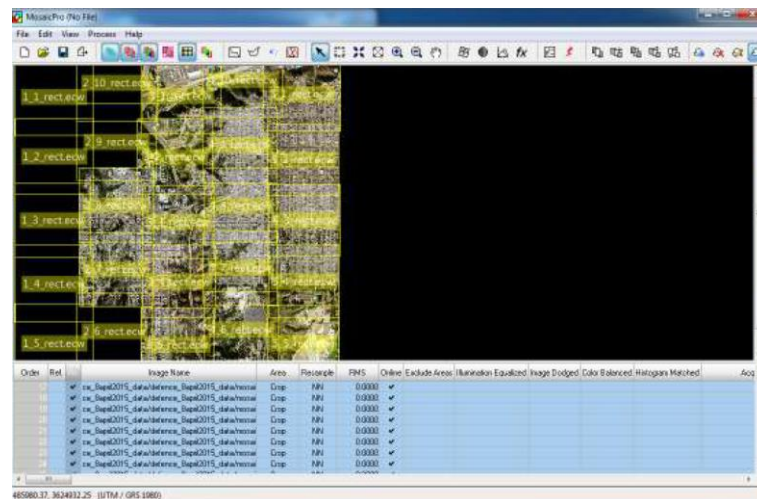
You will be introduced to the methods of creating mosaics in ERDAS IMAGINE. In particular the MosaicPro tool will used compare different colour balancing methods and to generate a final seamless mosaic.

11 EXAMINING ELEVATION DATA

(1 unit)

This section is intended to introduce you to the basics of Elevation Data. It will introduce users to the various relief methods in IMAGINE such as shaded relief, painted relief and level slicing. It will also introduce you to the concepts of contour, slope and aspect.
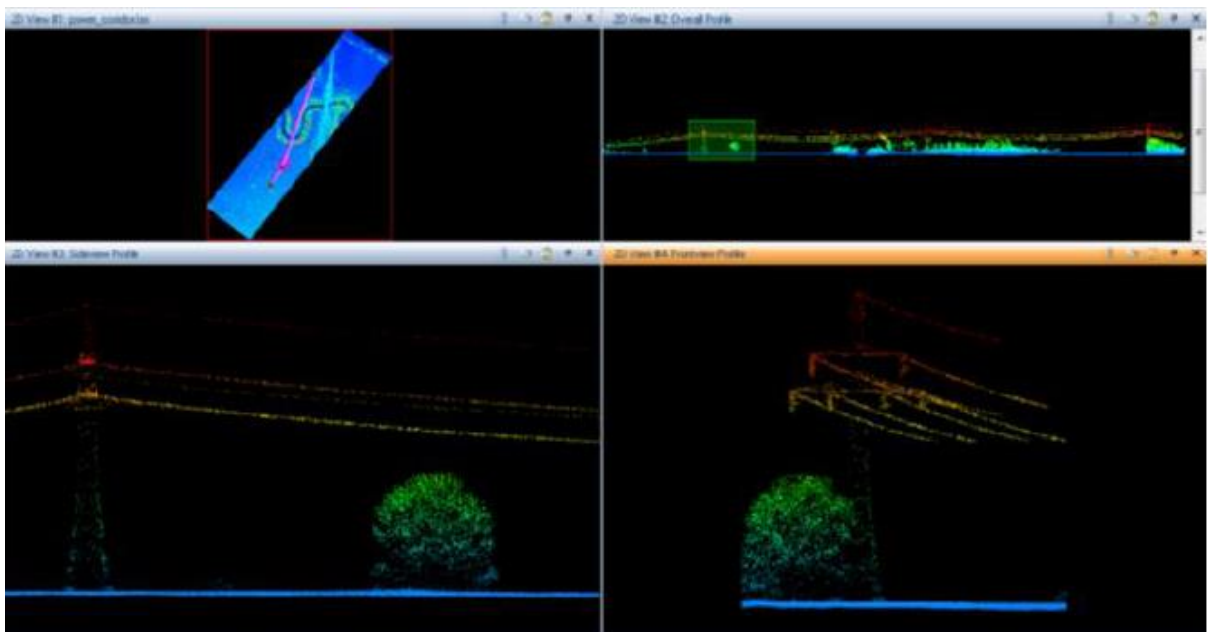
12   TERRAIN PREP TOOL

(1 unit)

You will utilise the Terrain Prep Tool to combine existing digital terrain models (DTMs) into one DTM, divide a DTM into several DTMs, and create a raster surface from a DTM.

13   FROM POINT CLOUD TO HIGHLY ACCURATE SURFACES

(2 units)

You will be introduced to the point cloud format and manipulate datasets that have been acquired from airborne survey and photogrammetric techniques. You will create profiles, edit the data, classify point clouds, and understand how to create surfaces from point clouds.

14 CHANGE DETECTION

(2 units)

There is a wide variety of change detection techniques and algorithms contained within ERDAS IMAGINE. This section will demonstrate a number of these methods and show how, using Spatial Modeler, change can be identified.

15 RECTIFICATION WORKFLOWS

(1 unit)

Rectification is the process of projecting the data onto a plane and making it conform to a map projection system. Images can be converted to real-world ground coordinates by referencing the image to another source that is in the desired map projection. Source information may be obtained from another image, vector coverages, or map coordinates. In order to accomplish this task, ground control points (GCPs) need to be selected from both the input source and the reference source. GCPs are points that are used to depict the same location on the Earth's surface.

16 MISSION PLANNING WITH VIRTUAL GIS

(2 units)

This section will enable you to become familiar with the IMAGINE VirtualGIS interface and to develop the use and management of Visualisation Tools. You will learn how to create cloud and mist layers, create a flight path and record a movie.

17 SPATIAL MODELER: COMBINE VECTORS WITH A LANDCOVER DATASET

(1 unit)

Image Classification techniques can do a good job of classifying land covers, but there are some places where they meet their limits. For example, unless you are using object-oriented classification, they generally can't tell the difference between a road and a parking lot. And what about where a tree overhangs the street?

Those pixels are spectrally different from the other road pixels and will never be correctly classified. You cannot fix that with traditional classification techniques, but you can use vector road data to define the road pixels into the Landcover image. This process, known as overlaying, can "burn" the roads (or any other class you have data for-- building footprints, streams, etc.) into your Landcover image. You will use the Spatial Modeler to create a model that successfully performs this task.
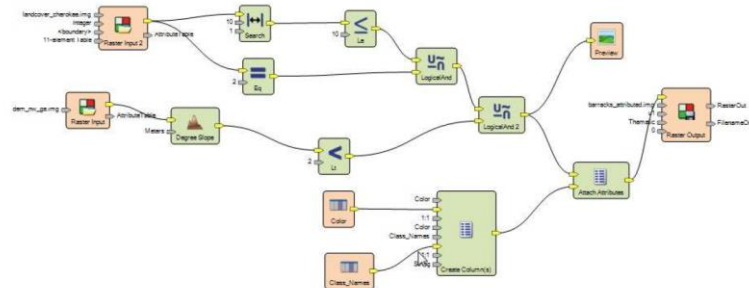
18 SPATIAL MODELER: "TIDY UP" A CLASSIFIED IMAGE

(1 unit)

 Building on the previous module, students will use a Focal Majority matrix to "tidy up" a landcover image before overlaying the streets.

19 SPATIAL MODELER: LOCATE SITE FOR MILITARY BARRACKS

(1 unit)

This section is intended to provide a basic introduction to the Spatial Modeler adapted to Defence force personnel. The key objective is to analyse an existing area of interest, interpret the environmental conditions and isolate the ideal location for a military barracks. The area of interest will be reduced down to areas with a slope of 1 degree or less. This area will then be reduced down to include locations no more than 150m away from the water. Lastly the desired Landcover for barracks needs to be forest. This ensures easy clearing and land availability vs other land cover types.

20 SPATIAL MODELER: HELICOPTER LANDING ZONES MODEL

(1 unit)

Building on the previous module, students will adapt the model to identify potential Helicopter Landing Zone sites.

21 SPATIAL MODELER: CLASSIFICATION USING MACHINE LEARNING OPERATORS

(2 units)

Learn how to build spatial models that use machine learning operators such as random forest, to perform raster and feature classification. These methods are now a popular alternative to traditional spectral supervised classification, and they utilise many of the same techniques for training.

22 TAKING GEOPROCESSING TO THE NEXT LEVEL USING SPATIAL MODELER

(4 units)

Using skills acquired through previous Spatial Modeler modules, you will design and run a model that extracts building footprints using airborne lidar and CIR imagery. This module encourages self-learning and experimentation, which are key to getting the most out of

the Spatial Modeler. The instructor will provide help and advice when needed and you will be rewarded with a complex, useful model.

23 MAPPING FEATURES WITH ARTIFICIAL INTELLIGENCE IN ERDAS IMAGINE

(2 units)

You will gain a broad understanding of how to use the dedicated machine learning interface in IMAGINE in order to collect training data. You will explore tile-based raster classification and learn how to extract objects using deep learning algorithms. Note: due to the complexity and time required to collect training data, pre-packaged data will used for this module.

24 SEMANTIC SEGMENTATION IN ERDAS IMAGINE

(2 units)

Introduced in ERDAS IMAGINE v2020 Update 3, semantic segmentation takes object-based feature extraction to the next level. Using Deep Learning algorithms, you will learn how to collect suitable training data and build the necessary Spatial Models to exploit that data using semantic segmentation. Note: due to the complexity and time required to collect training data, pre-packaged data will used for this module.

GEOSPATIAL
INSIGHT

HEXAGON

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