

Powering Geospatial Imaging

ROLF SCHÄPPI, Leica Geosystems, Heerbrugg

1. INTRODUCTION

Leica Geosystems is Powering Geospatial Imaging through the most advanced technologies and complete imaging solutions across all links of the Geospatial Imaging Chain.

What is Geospatial Imaging? It is the science of collecting information from images of the earth's surface, then turning this information into knowledge to help make more informed decisions. Collecting information and efficiently turning it into knowledge is the challenge. Data must first be captured and then spatially referenced; this information is then measured, analyzed and presented. This end-to-end workflow is called the Geospatial Imaging Chain.

2. CAPTURE

Whether you plan to use aerial photographs, satellite or LIDAR images, your geospatial information must first be captured. This is the first link in the Geospatial Imaging Chain.

Using sophisticated cameras, digital sensors, LIDAR airborne sensors, satellite imagery, and post-processing software systems, raw geographic and topographic data can be obtained, recorded and archived as a permanent record of the earth's surface.

Leica Geosystems offers proven hardware and software solutions that capture, record and archive the information you need.

First developed in the 1920's, the **RC30 Aerial Camera** is a standard in the industry. It boasts robust, dependable technology that produces the highest quality aerial photographs.

The **ADS40 Airborne Digital Sensor** captures and processes imagery with a spatial resolution of approximately 15 cm. Panchromatic, color and infrared channels can all be captured using this industry leading technology.

Using sensitive laser technology, the **ALS50 Airborne Laser Scanner** maps topography and terrain and yet is a compact, low-profile scanner that is easily mounted in helicopters and light aircraft.

The **DSW600 Digital Scanning Workstation** is a scanner for photogrammetric professionals. It provides reliable, high-precision, faithful radiometry and geometry and comes with a complete suite of software.

3. REFERENCE

Once captured, the raw data must be tied to the earth's surface and related to a ground reference system. This process is undertaken to ensure the data accurately corresponds to a known location on the earth's surface. Subsequent measurement, analysis or utilization in a geographic information system is completely dependent on the Reference link in the Geospatial Imaging Chain.

Leica Geosystems continues to power the Geospatial Imaging Chain by providing powerful tools that accurately reference data.

ERDAS IMAGINE® allows for powerful, yet simple, single-scene rectification and orthorectification.

Image Analysis™ for ArcGIS lets you rectify images within the ArcGIS environment making the imagery available to many GIS users.

Using the photogrammetric approach, **ORIMA** is an easy-to-use, orientation management software which processes large data sets of image coordinates, ground control points and GPS coordinates.

Leica Photogrammetry Suite is the next generation of photogrammetric tools that will help easily transform imagery into reliable geospatial content. This new software technology seamlessly integrates digital photogrammetric products into a process and workflow driven environment.

4. MEASURE

Once imagery is tied to the earth's surface, it's possible to pull out specific geographic information. The Measure link in the Geospatial Imaging Chain assesses the data source and finds specific data. Then it's possible to collect 2-D and 3-D vectors, points and areas, create digital terrain models, or classify LIDAR points to discern ground characteristics.

Measurement tools from Leica Geosystems make collecting, modeling and classifying data simple and painless.

ERDAS IMAGINE enables users to take simple but accurate measurements of features to produce vector maps or simple statistics.

Stereo Analyst® for ArcGIS offers users the power of extracting features using ArcGIS Edit tools. Two overlapping images are overlaid and displayed in a stereo environment to provide a true representation of the earth's surface. Consequently, the accuracy of measured features is greatly enhanced.

PRO600 puts flexible, easy to learn CAD-based tools in user's hands, providing all the mapping data functions needed. These include signs, symbols, colors, line thickness and many combinations of user-defined line-types and forms.

5. ANALYZE

Searching for relationships between images, ground features and even hidden objects is the basis of the Analyze link in the Geospatial Imaging Chain. Understanding these relationships empowers users to construct explanations and draw conclusions about the processes and activities taking place on the earth's surface.

Proper analysis is key and Leica Geosystems provides the right tools:

ERDAS IMAGINE has always been the first choice in powerful, spatial analytical tools. This comprehensive suite includes **IMAGINE Expert Classifier™**, **Model Maker** and advanced classification and **IMAGINE Spectral Analysis™** tools. The power of ERDAS IMAGINE is in the diversity of functions that it makes available to an image analyst.

Image Analysis for ArcGIS is an intuitive, easy-to-learn package which works directly with your data stored in an ESRI Geodatabase. Simple interfaces to powerful tools facilitate the analysis of datasets rapidly and efficiently.

6. PRESENT

Decision makers need to be presented with valid and accurate information to do their jobs well. Whether as a hardcopy map, a 3-D fly-through or a complex geographic database, reliable information extracted from the Geospatial Imaging Chain can be visualized, shared, stored, and most importantly, presented digitally. The Present link enables you to make sound decisions. Presenting the final product is easily accomplished with solutions from Leica Geosystems.

The **IMAGINE Geospatial Light Table™** was designed specifically by imagery users for imagery users. It allows rapid, efficient display of key material and combines the best features of the IMAGINE Viewer with the exploitation tools found in an Electronic Light Table.

The **Map Composer** tool provides a full suite of map and map series production tools that are fully integrated with ERDAS IMAGINE.

IMAGINE VirtualGIS® generates realistic 3-D scenes through which users can “fly” through in real time. Created primarily with elevation data and imagery, these 3-D presentations can be enhanced by using annotations, models, symbols and texture maps.

7. CONCLUSION

In the world of GIS and geospatial imaging, each industry, company, and individual is involved with the Geospatial Imaging Chain. Whether a photogrammetrist orthorectifying a block of 500 images, an aerial surveying company mapping a pipeline corridor or a GIS analyst updating parcel boundaries, all are involved with one or more links in the Geospatial Imaging Chain.

By providing a suite of hardware products, software tools and integrated solutions, Leica Geosystems is empowering users across every link of the Geospatial Imaging Chain and *Powering Geospatial Imaging*.

