firstquarter
2005

the digital perspective

Leica Geosystems GIS & Mapping introduces the DSW700 Digital Scanning Workstation

Continuing its tradition as industry leader in commercial photogrammetric production scanning, Leica Geosystems GIS & Mapping recently introduced the DSW700 Digital Scanning Workstation. The availability of the DSW700 brings to the marketplace a new high performance scanner, and components that enable updating of previous models with the latest technology as well.

High performance scanning is a key ingredient in a successful digital photogrammetric production workflow. In order to meet the demands of projects that often necessitate overnight roll-film scans, production photogrammetrists require high optical resolution at a very high speed.

The Leica DSW700 Digital Scanning Workstation offers higher performance, greater functionality and improved return on investment. With precision scanning of color or black and white film transparencies on both cut and roll film, the DSW700 provides digitized image data to digital photogrammetric workstations running Leica Photogrammetry Suite (LPS), ERDAS IMAGINE® software and any digital photogrammetry or image analysis systems.

Commercial scanner users rely on scanning systems to process major photogrammetry jobs with consistent accuracy, without the need for many adjustments. In order to achieve optimal results without correction, it is essential that the initial scanning process facilitate getting as true an image as possible.

The DSW700 features a new three color LED light source, to enable more consistent illumination, increasing the illuminated area to accommodate a larger sensor. The new design prevents dust and dirt accumulation during scanning, with a minimized optical path which goes directly to the digital sensor. The direct LED light source also keeps the stage and optical path free from unwanted heat sources, ultimately leading to improved image quality.

In addition to enhancing the image quality, the new LED light source also provides a more efficient implementation of sequential color capture than ever before, resulting in three band color captures with speeds comparable to black and white captures in previous models. When combined with the high performance sensor, the three color LED light source reduces capture noise, produces faster capture time and improves tonal sensitivity for an essentially distortion free image.

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capture ··· reference ··· measure ··· analyze ··· present
POWERING GEOSPATIAL IMAGING℠

Leica Geosystems

Three-Line Sensors: Rapid, Efficient Digital Imagery

The age of digital airborne imaging has arrived. Although traditional frame cameras and scanners are still the most widely used methods of data acquisition, there is a noticeable shift as new and improved digital sensors enter the market. Since its introduction, digital sensor technology has made great strides in automation and quality, and digital sensors are also helping enable streamlined, more integrated workflows. Leica Geosystems GIS & Mapping was the first vendor to enter the market with a commercial three-line sensor approach with the innovative ADS40 Airborne Digital Sensor. Many vendors are now offering small digital frame cameras and digital multi-patch frame cameras in an attempt to compete with the three-line sensor approach.

Three-Line Digital Airborne Sensors

Three-line digital airborne sensors are gaining industry awareness, quickly becoming the preferred sensors in the market. Three-line sensors capture three different views: forward, backward and nadir. This provides better insight into all parts of an imaged area, because the three strips for each view — the pixel carpets — offer 100 percent overlap from three perspectives. The three-line principle is based on the proven satellite design of a pushbroom type sensor and results in no dead zones or occluded areas. It enables the user to cover much larger areas of the earth's surface in record time, and at a lower cost than incurred when acquiring frame imagery.

Streamlined, Cost-Effective Workflow

In a three-line sensor, data is collected line by line, rather than frame by frame. The ADS40 produces a long, continuous strip 12,000 pixels wide. The pixel carpet output from a three-line sensor greatly diminishes the need for mosaicking. With traditional frame imagery, users must join each frame to the adjacent images before analysis of a plot can begin. The mosaicking process is quite time and labor intensive. By reducing the time spent stitching images together, users are able to begin analysis sooner. This helps to improve both efficiency and cost-effectiveness on projects utilizing imagery produced by a three-line sensor.

Comprehensive Coverage

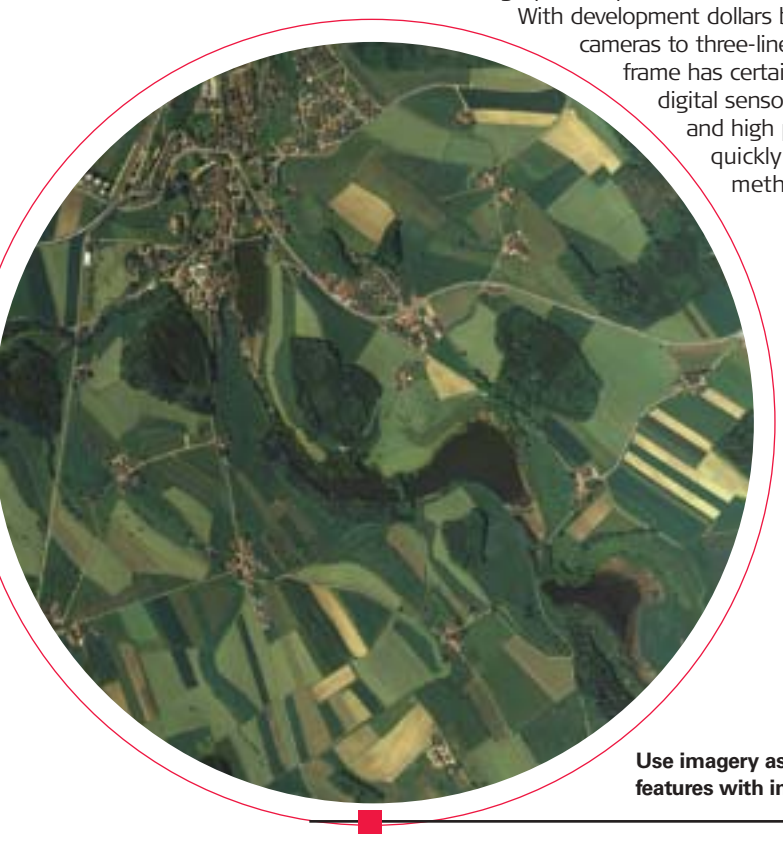
The three-line sensor can easily generate three-dimensional data of an area, as well as imagery for use in stereo analysis. Triplets produced by a three-line sensor (forward, backward and nadir) offer higher accuracy and enable the user to conduct more detailed analysis. For example, a building can be seen from three perspectives, which enables the user to have a better understanding of how the building relates to its surroundings. This comprehensive information can be used in simulations or analysis such as the interplay of wind with high-rise buildings, fire propagation, flooding, and telecommunications (such as cellular tower lines of sight).

The images above are forward and backward views captured simultaneously with the ADS40.

While frame cameras can offer the high resolution required for highly detailed analysis, three-line sensors, with resolutions of up to five centimeters per pixel are better suited to larger projects. Although the pixel carpet files are quite large, today's complete systems can handle the load. As more high-volume storage devices are made available, especially for storing data onboard during a flight, the devices are also becoming smaller and can offer better, more efficient digital workflows.

The amount of useful information collected during a single flight with a digital sensor is approximately equal to the amount of information available after standard aerial photographs have been exposed and scanned. In fact, a three-line sensor can capture panchromatic, RGB and near-infrared images simultaneously; effectively tripling the amount of information collected.

With the advent of three-line sensors, what will become of frame mapping cameras? Frame imagery is not yet obsolete; and it won't be anytime soon. With development dollars being redirected from frame cameras to three-line digital imaging sensors, however, frame has certainly hit its peak. The three-line digital sensors' automated workflow, flexibility and high performance-to-price ratio is quickly becoming the preferred method for imagery acquisition.



Use imagery as a reference to edit terrain features with increased accuracy.

Cooper Aerial Surveys Company is first sale of DSW700 Digital Scanning Workstation

Leica Geosystems GIS & Mapping recently announced the sale of the DSW700 Digital Scanning Workstation to Cooper Aerial Surveys Company.

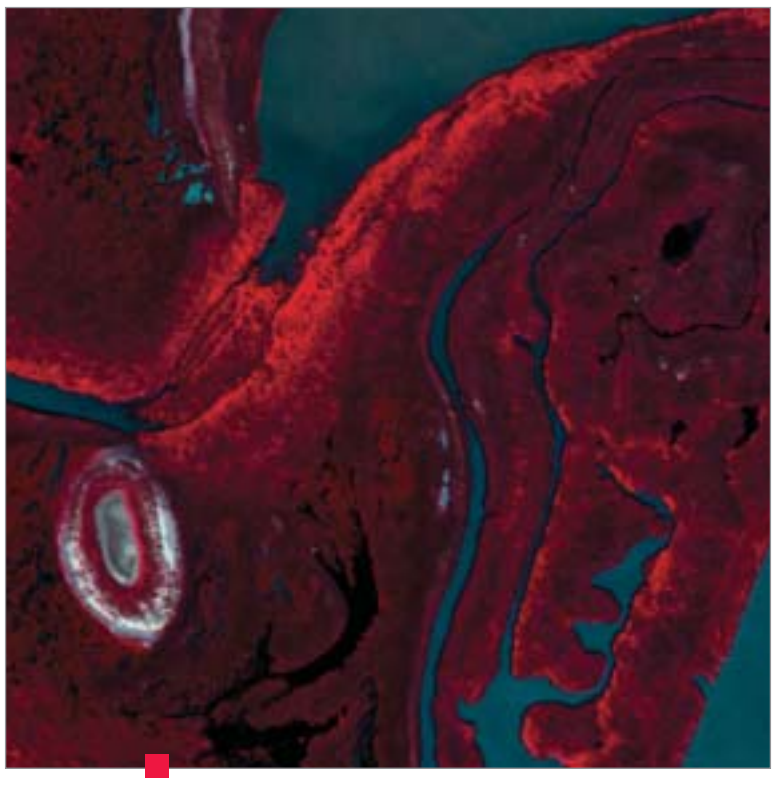
Cooper Aerial is a multidisciplinary aerial photography and mapping company founded in 1966, which serves engineering firms, the mining industry, architectural firms, real estate developers, and municipal, state and local governments. The company has offices in Phoenix, Tucson, and Hermosillo, Sonora, Mexico.

Cooper Aerial has a longstanding relationship with Leica Geosystems; the company employs a Leica RC30 Aerial Camera System for its photography services, and has owned a DSW200 for several years. The DSW700 will enable Cooper Aerial to offer its customers faster turnaround and higher resolution on every scan.

"The Leica DSW700 is already helping us to streamline our digital workflow. We expect the scanner to pay for itself within the next year and a half," said Robert Murphy, vice president of Cooper Arial Surveys Company. "With the DSW700, we can be confident in planning and executing all phases of a project in-house."

"Cooper Aerial has been a stellar customer of ours for several years, and we are proud to help Cooper provide its customers with geometrically and radiometrically accurate scans, while maximizing performance, increasing reliability and reducing costs," added Richard McKay, vice president of sales for Leica Geosystems GIS & Mapping.

Featured Images



False color ADS40 image of coastal habitat near Corpus Christi, TX

Color ADS40 image of part of Austin, TX

U.S. Forest Service Improves Efficiency of Forest Inventories

Geospatial Mapping Improves Efficiency of Forest Inventories
The U.S. Forest Service Forest Inventory and Analysis Program (FIA) is responsible for inventorying the forested lands of the United States of America, both inside and outside national forest boundaries. As a result of the increased frequency of inventories, the Forest Service sought more efficient, cost-effective methods for executing the annual forest inventory.

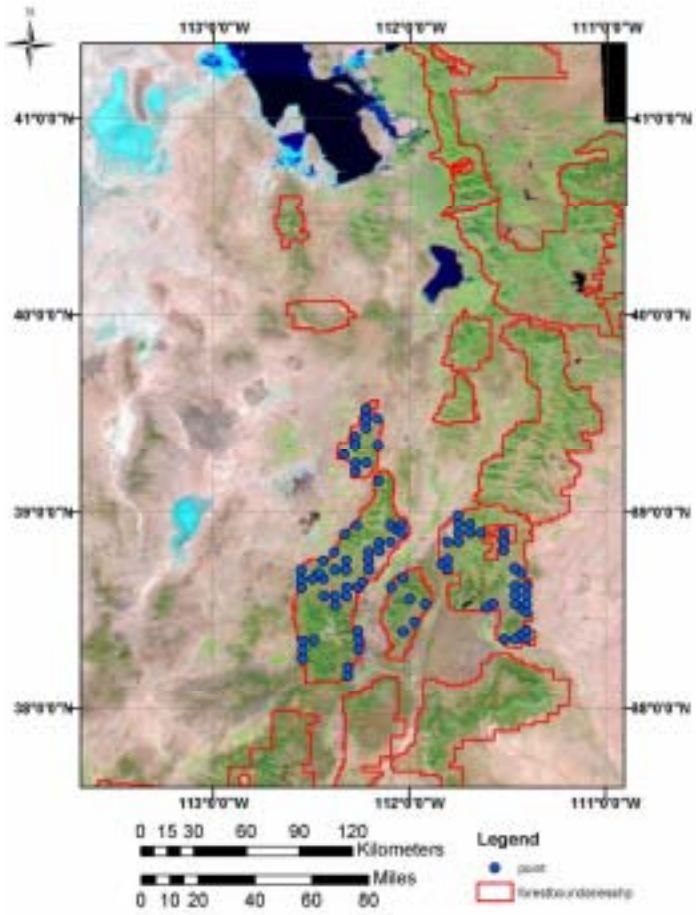
Precision vs. Cost in Aerial Photography
The Forest Service Remote Sensing Applications Center (RSAC), Interior West FIA and Red Castle Resources Inc. set out to determine the accuracy and cost effectiveness of using large scale digital aerial photos to sample FIA plots as part of its annual inventory. The project analyzed the precision of tree-height measurements from aerial photos and compared the cost of using ground crews to the cost of using aerial photos.

Study Details
The aerial photos of the FIA plots, obtained from a private contractor equipped with a Leica RC30 Aerial Camera System, were required to meet specifications of sun angle, overlap and scale. Three photos were collected for each plot to allow stereo viewing from two different perspectives.

Accurate Results
The results of this study showed that tree-height measurements made from aerial photographs are within the ten percent error allowed of FIA ground crews. Working from high resolution images, a photo interpreter can easily do the job of many field crews, compiling forest measurements within a relatively large continuous area, and it can be done with less training and expense.

Cost Benefits and More
The difference in cost between measuring a plot on the ground, estimated at over $1500 per plot, and using photo-interpretation methods — approximately $510 per plot — provides a significant incentive for combined ground and photo-based sampling. For 100 plots analyzed through combined ground survey and photo analysis, there would be a total savings of $54,000.

Additionally, the cost of using scanned analog 9x9 photos is considerably higher than if digital photos are acquired directly using a commercial-grade, high resolution digital camera, such as the Leica ADS40 Airborne Digital Sensor.

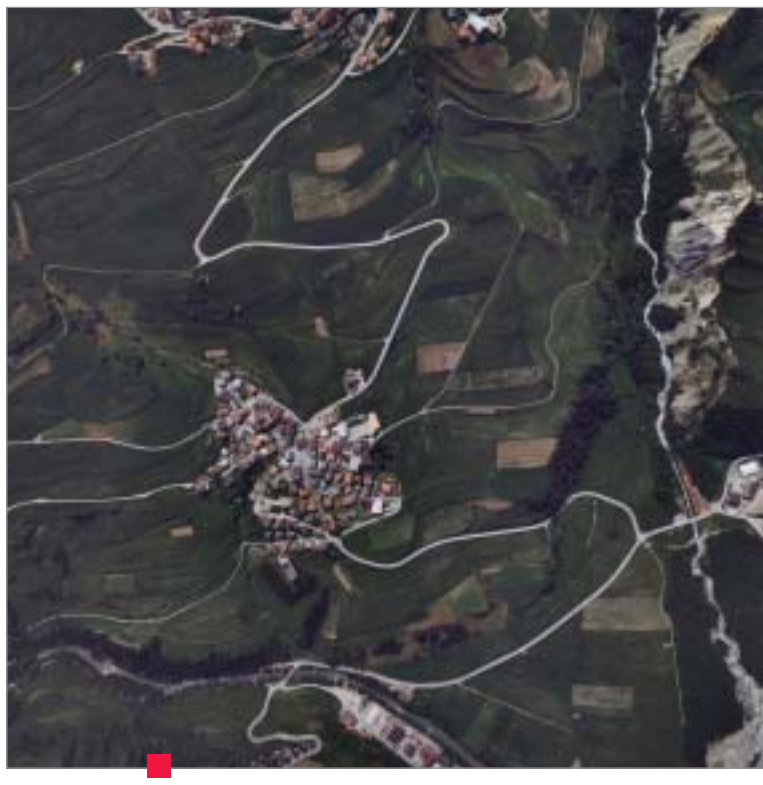


FIA Plot Locations
Fish Lake National Forest UT
Image courtesy of USFS RSAC

By combining traditional ground crews and aerial photography, the Forest Service will benefit from increased cost efficiency, while preserving accuracy and fulfilling its annual inventory requirements.

The work discussed within is developed for the guidance of employees of the U.S. Department of Agriculture (USDA) Forest Service, its contractors, and its cooperating federal and state governmental agencies. The Forest Service assumes no responsibility for the interpretation or application of information by other than its own employees. The use of trade names and identification of firms or corporations are for the convenience of the reader; they do not constitute official endorsement or approval by the United States government, other products or services may be equally suitable.

Featured Images



The DSW700 can be used to scan archived imagery in order to produce a digital dataset.

A DSW700 scan of an infrared image.

On The Horizon

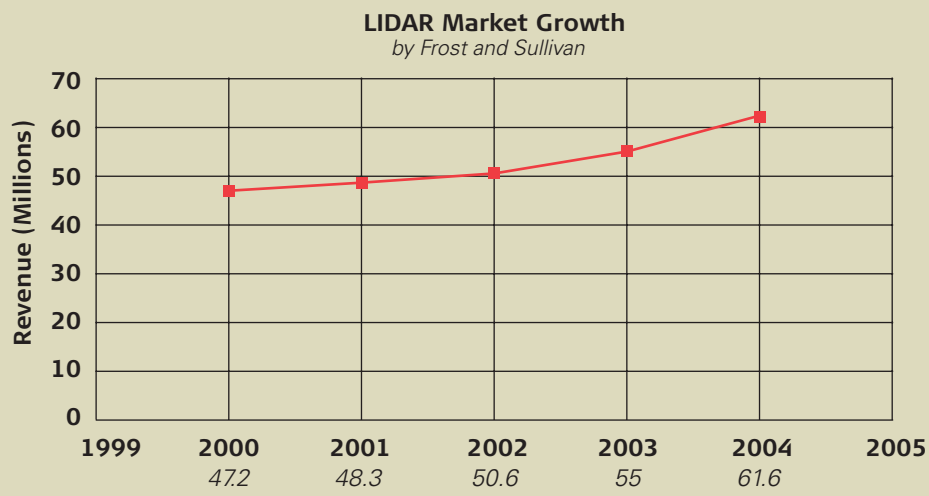
Emerging Markets... Expanding Opportunities in the Forestry Industry

Aerial photography and the processing of the digital imagery are increasingly being used to gather valuable information in the forestry industry. The US Forest Service Inventory project demonstrates that geospatial imaging can play an integral role in collecting forest area information. The use of LIDAR technology is an effective and cost-efficient alternative to the manual information collection survey process, and can yield results that are equally as accurate.

Environmental conscientiousness, efficiency in forest management and increased demand of forest materials, among other factors, have led to a boost in the demand for forest inventory and associated statistics. Government and business entities are engaging in a variety of studies such as: the assessment of high fire risk areas; detection and tracking of insect infestations; harvesting of forest products; sizing of the forestry market; and environmental remediation assessment. LIDAR enables more comprehensive data collection for these types of projects.

Remote sensing with LIDAR technology facilitates better data gathering in remote locations. More precise readings of the height and density of trees allow for a more accurate representation of forest areas. The increased capabilities and enhanced functionality of geospatial hardware and software technology make it possible for decision makers to rely on the detailed and precise information that digital imagery provides. As this trend continues, LIDAR technology will continue to create opportunities for Leica Geosystems solutions in the forestry industry.

According to the North American Remote Sensing Report (Vertical Market Analysis 2004) LIDAR revenues related to the forestry industry will more than triple by 2010.



The many ways LIDAR is being used in Forestry

- Flood plain mapping
- Fishery monitoring & enforcement
- Wetland remediation
- Coastal and port construction
- Monitoring shoreline erosion
- 3D models of the terrain
- Planning for access to remote areas
- Analysis of atmospheric pollution
- Timber extraction
- Forest management
- Abiotic hazards: storms & fires
- Assistance with silviculture
- Monitoring re-vegetation and regrowth
- Assessing the environmental sustainability of logging
- Tracking forests' ability to soak up greenhouse gasses
- Mapping the movement of gasses, particles and pollutants in the atmosphere

Calendar of Events

Date	Event	Location
March **3–11**	**ASPRS Annual 2005 Conference** www.asprs.org	**Baltimore, Maryland USA**
April **25–26**	**LIDAR Mapping Forum 2005** www.lidarmap.org	**New Orleans, Louisiana USA**
June **13–19**	**46th Paris Air Show** www.paris-air-show.com	**Le Bourget, Paris, France**
October **23–27**	**16th Pecora Remote Sensing Symposium** www.asprs.org	**Sioux Fall, South Dakota USA**

Did You Know

The DSW700 now uses an LED light source

DSW700 Introduced

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The phenomenon of Newton rings, formed by space in between pressure plates, has become a common by-product of scanned images. The DSW700 features anti-reflective glass on the stage and cover plates to reduce the amount of reflection between the pressure plates, dramatically reducing – and in some cases eliminating – the visibility of Newton rings.

Using the DSW700, a color air photograph can be scanned in approximately 3-1/2 minutes.

Consistency in the basic design of all DSW models makes it easy for current Leica DSW scanner customers to upgrade their systems to DSW700 status. Old components can quickly and easily be replaced in the field with the enhanced components of the DSW700. The easy upgrade path protects the initial investment, offering customers a cost-effective way to enjoy the increased productivity and improved quality of the newest technology without replacing their entire system.

The DSW700 improves on key technologies to provide a faster, more accurate and productive scanner. Improved speed and functionality, enhanced image capture capabilities and great return on investment value combine to make the Leica DSW700 Digital Scanning Workstation a market leader in high performance scanning.

Show off your imagery!

Do you have outstanding images acquired with a Leica Geosystems GIS & Mapping airborne sensor, scanner or camera? We are looking for striking imagery to showcase in The Digital Perspective.

Submit your key images, along with an overview of the project and your entry could be the featured imagery in an upcoming issue of The Digital Perspective.

Each issue will showcase featured images that highlight the capabilities of Leica products.

For our inaugural issue, we are sharing two images. The black and white image on the enclosed poster shows the Bristol Motor Speedway in Bristol, Tennessee, USA; it was taken by the ADS40. The second image is an example of a DSW700 scan of a Infrared photograph as used in the forestry industry.

You've done great work – share it with your colleagues! To enter your images or for more information, please contact Sara Upchurch at +1 404 248 9000 x2336 or sara.upchurch@gis.leica-geosystems.com.

SEND IN YOUR IMAGES TODAY!

The Mobile Processing Center: An all-in-one solution

Leica Geosystems GIS & Mapping presents a one of a kind solution for storage, processing and archiving of digital aerial data.

Leica Geosystems GIS & Mapping has tailored a solution specifically designed to meet the needs of customers who need an IT infrastructure to support processing, warehousing, and archiving of large quantities of data captures by the ADS40 Airborne Digital Sensor and ALS50 Airborne Laser Scanner. The Mobile Processing Center from Leica Geosystems supports the management and processing of imagery, and with seven terabytes of storage, serves as a compact processing, storage, and archive device with major capacity.

The Mobile Processing Center is a customizable solution available in configurations that can be tailored to the customer's specific requirements. This self-contained portable device provides customers with a complete network that can accommodate processing and storage needs at any location. The unit enables complete data download and quality checks, saving the time and expense of exporting data to outside resources for processing.

An affordable solution at a lower price point than other options in the marketplace, the Mobile Processing Center is offered in six basic configurations, providing storage, processing, and archive capabilities in a variety of combinations. Multiple units can also be networked together to create a complete stand alone system.

When paired with the entire Leica Geosystems GIS & Mapping suite of products, the Mobile Processing Center rounds out a complete end to end solution for digital aerial photography companies.

Key features and benefits

- Processing capability configured for up to nine workstations
- Raw storage capacity for up to 14 TB of data
- Customizable and interchangeable configurations
- Ability to transfer data to tape for archival storage
- Improved efficiency for storage and processing
- Portability for processing in any location
- Reliability in an archive mechanism
- Cost effectiveness at an affordable price point
- In-house data processing capabilities

Contact Us

For more information about Leica Geosystems GIS & Mapping and its products, please call +1 404 248 9000 or +1 877 463 7327, email info@gis.leica-geosystems.com or visit gis.leica-geosystems.com.

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