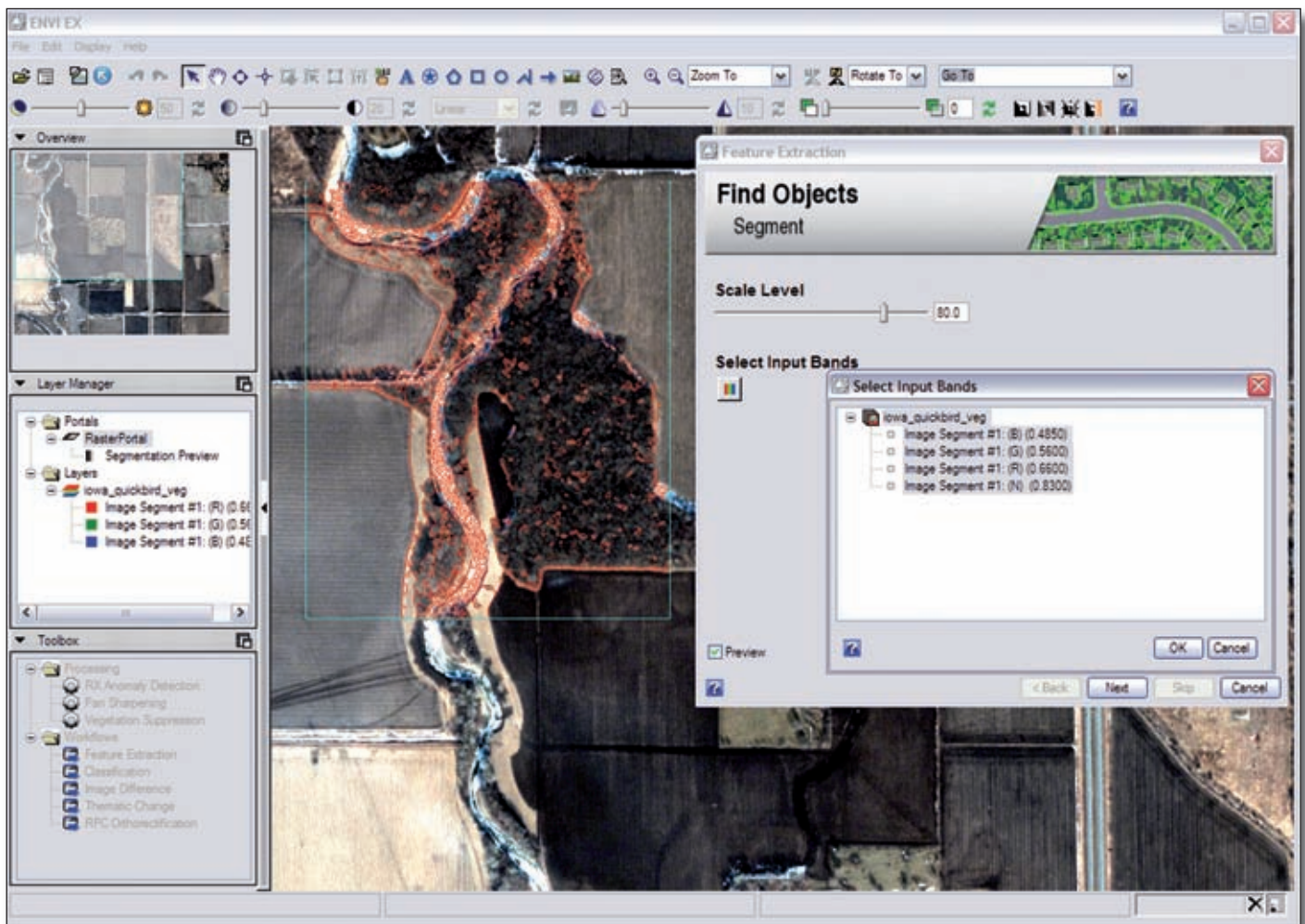


ENVI EX: Where GIS meets Remote Sensing

The boom of available satellite imagery didn't go unnoticed in the geospatial world. But rather than using imagery as a backdrop, GIS users now discover that it can be used for a lot more, like monitoring of wildfires, establish land cover maps, extracting features of interest etc.. In September 2009, ITT VIS launched its first version of ENVI EX, software which is fully integrated with ArcGIS, bringing remote sensing and GIS more closely together. In this interview, Rolf Schaeppi (Vice President European Operations) speaks about ITT's partnership with ESRI and what ENVI EX has to offer to the ArcGIS community.

By Eric van Rees



The ENVI EX interface is a dynamic, advanced interactive display window that supports even large imagery files. Intuitive menus allow you to display imagery quickly and easily. The Image Overview allows you to see the larger image and select an area for viewing. The Layer Manager allows you to select layers for viewing and manipulating. The Preview Window displays results at each processing step during the workflow on-the-fly.

Question: Could you tell us a bit about the company's origins and your products?

Rolf Schaeppi: While working with NASA's Mars Mariner missions at the Laboratory for Atmospheric and Space Physics at the University of Colorado, our company's founder, David Stern, began work on what would eventually become IDL, a programming

language for data visualization and analysis. In 1977, after several years prototyping, IDL was commercially released. NASA and other scientific organizations quickly realized IDL's potential and were among the first IDL customers. Soon, leading research laboratories and major universities across the country were using IDL to solve their data analysis and visualization challenges.

IDL also quickly became popular in the disci-

plines of earth science and remote sensing, to the extent that ENVI was developed using IDL as an application for extracting important information from satellite and airborne imagery. The first version of ENVI was released in 1994.

As data sets have become larger and more complex, the need to extract answers from data has grown as well. IDL and ENVI both continue to expand in capability and gain

Brief Product Introduction

IDL

IDL is an ideal software for data analysis, visualization, and cross-platform application development. IDL combines all of the tools you need for any type of project, from "quick-look," interactive analysis and display to large-scale commercial programming projects. Thousands of technical professionals use IDL every day to rapidly develop algorithms, interfaces, and powerful visualizations and quickly crunch through large numerical problems.

ENVI & ENVI EX

ENVI is an ideal software for extracting important information from all types of digital imagery. ENVI's image processing package includes advanced yet easy-to-use spectral tools, geometric correction, terrain analysis, radar analysis, raster and vector GIS capabilities, extensive support for images from a wide variety of sources, and much more.

Being developed using IDL, ENVI in combination with IDL, is completely flexible and extensible, thus adaptable to meet the customer's specific requirements.

ENVI is the choice of many imagery scientists and professionals for extracting scientifically accurate information from imagery. Now ENVI EX delivers the accurate, scientifically proven processes that ENVI is known for in revolutionary step-by-step workflows that quickly and easily guide you through advanced image processing tasks, regardless of your experience level.

IAS – Image Access Solutions

Image Access Solutions considerably improves the storage, access, management and delivery of image files by optimizing the wavelet compression capabilities of the JPEG 2000 standard. Using intelligent streaming technology, Image Access Solutions delivers important information faster, increasing the speed and accuracy of your decision-making process.

prevalence in the marketplace. In 1998, IDL was named a "NASA Milestone Technology of the First 40 Years" for its value in helping NASA scientists make important discoveries. ENVI has also become an industry-leading product for image analysts and image scientists worldwide. This year ITT released a new product to bring image analysis to a new set of GIS users. The new product, ENVI EX, delivers the robust image analysis of ENVI in step-by-step workflows for the imagery tasks most needed by GIS professionals.

We are here at the ESRI European User Conference in Vilnius, Lithuania. ITT VIS has a partnership with ESRI for some time now. How did this partnership come into being?

RS: Our partnership with ESRI started when ITT Visual Information Solutions developed the NITF Extension for ArcGIS three years ago. The partnership between ESRI and ITT Visual Information Solutions has strengthened over that time with the shared belief that imagery is now a part of GIS and imagery is more

important than ever for GIS users today. Imagery is growing in availability and is of growing value to the GIS user. Both ESRI and ITT are pursuing product development strategies that integrate the ArcGIS and ENVI product lines with the intention of creating tools that facilitate the integration of imagery into GIS workflows.

How are remote sensing and GIS combined with ENVI EX? And what problems does it solve for the GIS user?

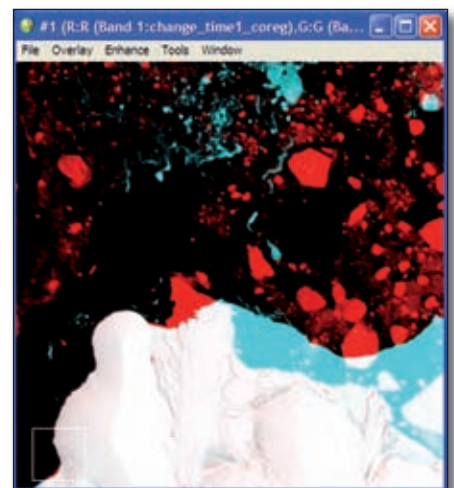
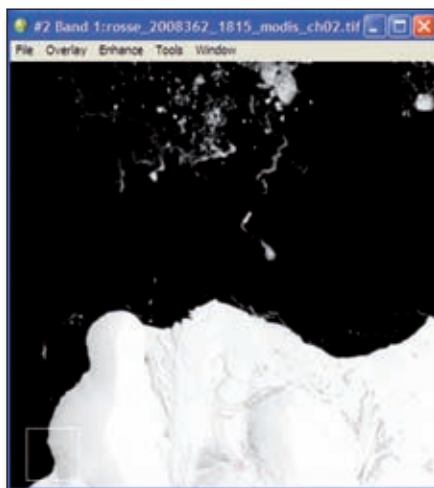
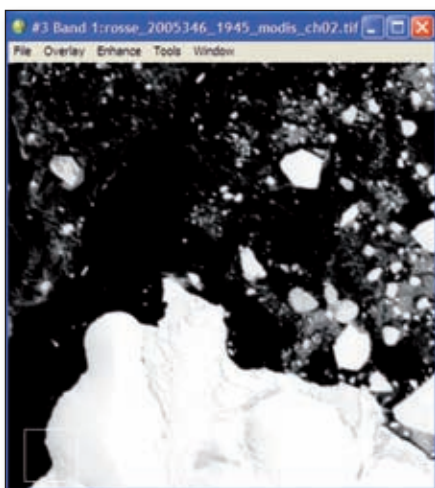
RS: The challenge with integrating imagery and remote sensing technology into GIS workflows is that it often requires a lot of imagery analysis to get information that is useful to the GIS professional. Historically, tools to analyze imagery have been difficult to use and analysts needed image science backgrounds to derive meaningful products. The challenge was to distill the vast amount of functionality of ENVI into easy to use workflows so that the scientific rigor is maintained and the end user can produce accurate and repeatable

results without having a deep background in Remote Sensing science.

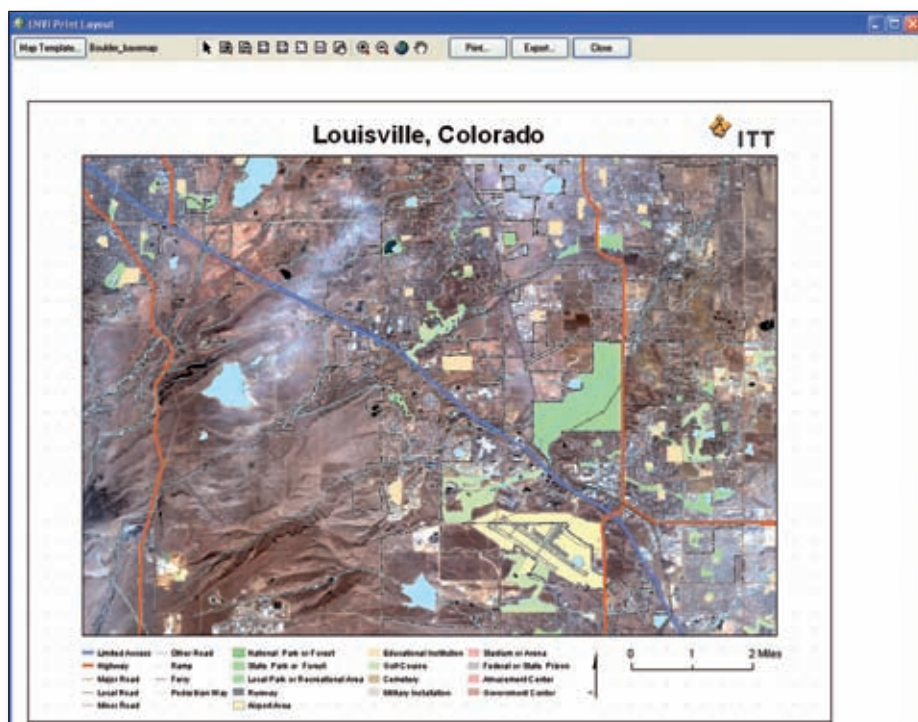
ENVI EX, as a result of this effort, is the new solution for image processing, analysis and exploitation for the ArcGIS community. The integration of the ENVI EX and ArcGIS reduces the complexity of working with imagery to enable geospatial analysts and GIS professionals to get useful information from imagery quickly and easily.

Based on ENVI, ITT's premiere image processing and analysis solution, ENVI EX now provides ArcGIS users with the superior image analysis methods and algorithms trusted by imagery professionals for years. The product's easy to use interface with intuitive processes guides users step by step through analyzing satellite and airborne imagery and data across a wide range of imaging modalities.

The new workflows in ENVI EX provide automated processes for solving problems that are common in GIS applications across a variety of industries. These workflows include tying an image to its geographic coordinate for accuracy in mapping, extracting features of interest from a large geographic area,



The image on the left is the "before" scene, the middle image is the "after" scene, and a 2CMV change detection visualization result is shown at the far right. The areas that have been removed from Time 1 to Time 2 are shown in red, and the areas that are new between Time 1 and Time 2 are shown in blue.



The new Map Layout view in ENVI EX allows users to take all image processing results and apply an ESRI map template for map composition, all from within the ENVI EX interface. (This capability is also available now in ENVI.)

detecting change in a region by comparing different images, classifying land cover, and finding anomalous features in an area. (See examples below.)

The seamless integration between ENVI EX and ArcGIS allows GIS users to easily exchange data and files from ArcGIS to ENVI EX with simple drag and drop methods that preserve the style, symbology, vectors, and layer information from one product to another. In addition, ENVI EX provides direct access to the full suite of map composition tools available in ESRI's ArcGIS.

This new capability gives users of both products increased workflow efficiencies and time savings when integrating imagery with GIS applications.

How do you explain the interest in imagery in GIS?

RS: GIS professionals recognize that imagery is essential for understanding what is happening in the world, learning how the environment is changing, and giving context to other types of data. Imagery availability, the power of its information content and the number of dissemination methods are rapidly increasing. While digital orthophotography is an essential element in a GIS professional's geospatial data store, high resolution color and multi-spectral satellite imagery is also coming into common use. As the spatial and spectral fidelity of these sources improve, so does the ability to extract important informa-

tion to GIS professionals.

One of the most common applications is the use of imagery as a data source to populate, update and assess the quality of GIS databases. Map accurate orthophotos or satellite images are used to collect (digitize) features such as road centerlines, land use areas, building footprints and utility infrastructure. Up-to-date imagery makes it easy to identify areas of development not yet captured in the GIS database. Automated image processing methods tailored for feature extraction can be used to reduce the effort of often tedious digitizing tasks of this type.

Other applications exploit the spectral content of the imagery to accomplish land use and land cover mapping; measure, monitor and assess environmental conditions; assess the condition of pavement and other public works assets; and identify building materials. Change detection is also possible when imagery is collected over time. The knowledge gained from these analyses is invaluable as input to land development models and forecasts, environmental impact statements, asset management budgets and reports for communicating important issues to community constituents.

A major focus of recent and ongoing ENVI development is providing tools and methods to extract information from images, and to then integrate these results with GIS databases. ENVI currently has many tools for these purposes, including workflows for common image processing tasks for GIS professionals,

converting to and editing common vector data formats, and geodatabase support. Moreover, upcoming releases will improve and add to these capabilities.

What do you think is going to be the future when looking at the partnership between ITT VIS and ESRI?

RS: As imagery continues to proliferate and the tools to extract features and information imagery grow, so too does the demand for image processing and management solutions across a wide variety of industries. It is our job to continue to provide the GIS user community with easy to use tools, like those in ENVI EX, so that they can get the benefit out of the many available and ever increasing image sources across distributed portals. Having made available that 'ease of use' on the desktop, the next steps are now to provide the same 'ease of use' and functionality in an enterprise environment. ITT Visual Information Solutions provides a comprehensive set of image and data preparation solutions, as well as image management and dissemination functionality that meets the demanding needs of today's geospatial enterprise deployments. Development plans for ENVI include many new workflow tools that will make image processing services available in the enterprise and even easier, leveraging proven ArcGIS server technologies.

Eric van Rees is editor in chief of GeoInformatics Magazine.

For more information on ENVI EX, have a look at www.ittvis.com/ProductServices/ENVI/ENVIEX.aspx www.ittvis.com