

# Imaging NOTES

EARTH REMOTE SENSING  
FOR SECURITY  
ENERGY AND  
THE ENVIRONMENT

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# The Whole World in Your Hands

ESRI and ITT VIS partner

UAVs

COMMUNITY  
REMOTE  
SENSING

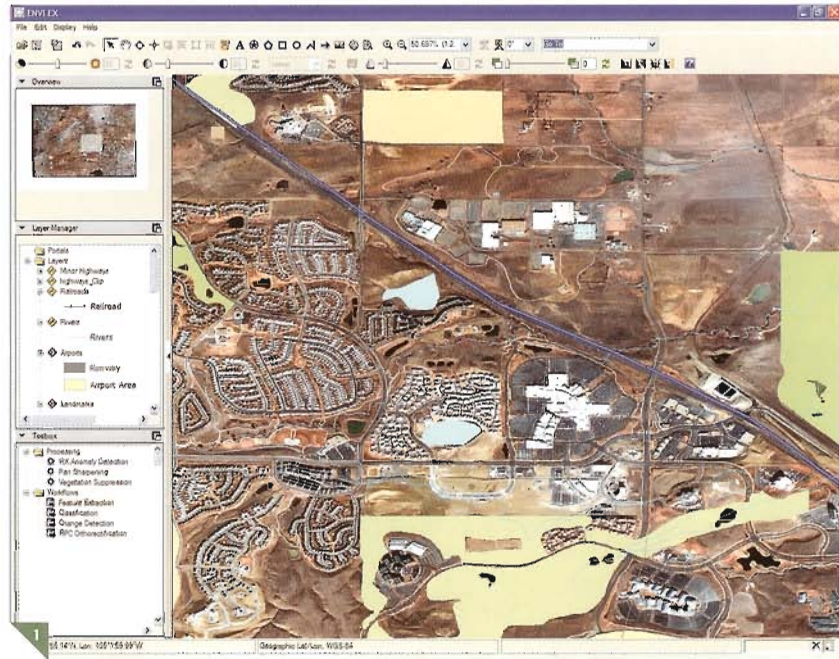
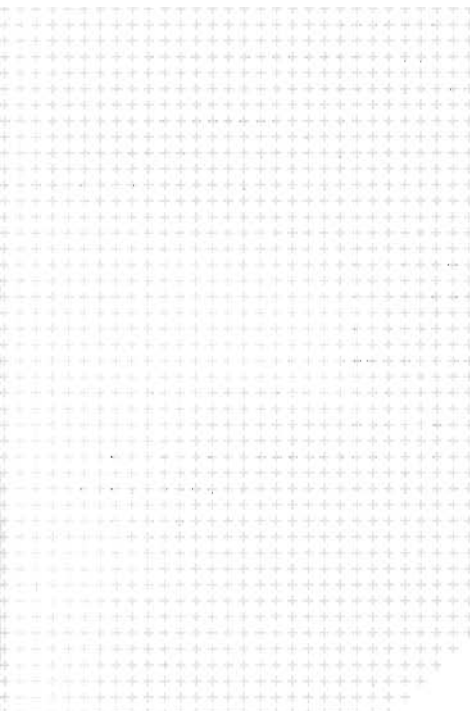
4D:  
TIME

# The Whole World in Your Hands

PUTTING FAST, DYNAMIC IMAGE DISSEMINATION AND ANALYSIS  
INTO THE HANDS OF GIS ANALYSTS

**I**magery is a wise investment for any organization looking to use geospatial data. The data can be used for everything from simple visuals, such as ground truthing and change detection, to more sophisticated analyses, including feature extraction and land-use classification. As imagery has become more accessible and more affordable in recent years, there is also a growing convergence of imagery and geographic information systems (GIS) applications. To make the most of the investment in imagery, image scientists and analysts need to be able to easily access imagery and move seamlessly between GIS and image processing applications to derive the most information possible from the imagery and data.

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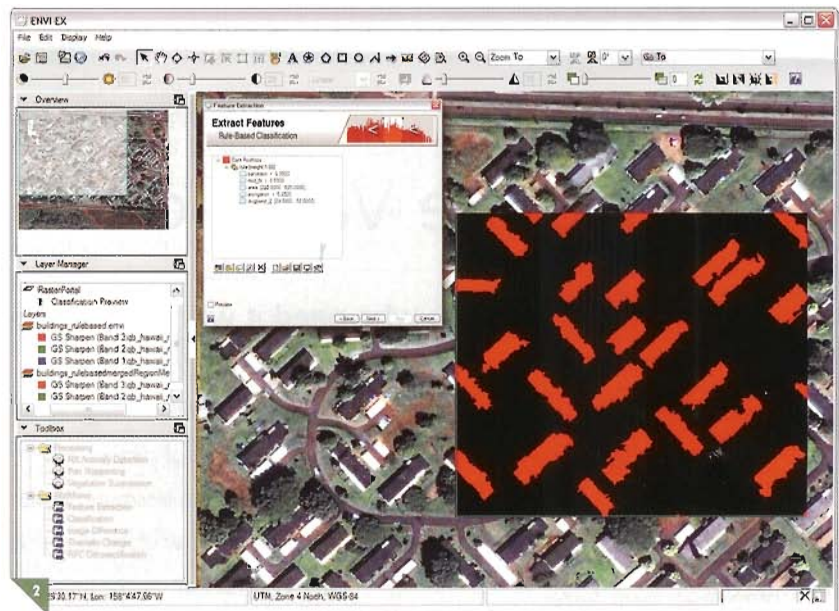


**▲ FIGURE 1**  
*ENVI EX from ITT makes it easy for users to seamlessly integrate and analyze data from their GIS. Shown here is an ESRI ArcGIS layer in ENVI EX with all the symbology preserved. This layer can be used in any of the ENVI EX automated analysis workflows in the toolbox.*

## Access and Use Large Amounts of Data

The large volumes of high-resolution imagery available today require organizations to create a strategy for storage and use. ESRI's ArcGIS suite of GIS software provides a high-performance enterprise platform for integrating imagery with other data, including vector maps and georeferenced information.

For data management, including imagery, ArcGIS Server is able to store vast amounts of data in one common location. Adding the ArcGIS Server Image extension provides dynamic mosaicking and on-the-fly processing. By using both ArcGIS Server and the



**▲ FIGURE 2**  
*ENVI EX has a comprehensive array of image processing and exploitation capabilities. Shown here is the beginning of the ENVI EX Feature Extraction workflow, an advanced object-based approach to automatically extract features of interest across an entire image. All feature extraction results can be exported directly into a geodatabase or into an ArcGIS project.*



**▲ FIGURE 3**  
 ENVI EX includes automated workflows for detecting change over time using imagery taken at different times or with different sensors. In this case, ENVI EX is able to easily identify and export areas with significant changes in vegetation both from manmade features (the road in the lower right) and natural activity (the tsunami destruction of shoreline). These results can easily be exported to a geodatabase for further analysis and map composition.

ArcGIS Server Image extension, data managers are able to create multiple products quickly from a single source. Imagery can be optimized for analysis and made available quickly after acquisition, all without data duplication. The extensive storage overhead and processing delays previously required when working with imagery are significantly reduced, since only the original set of source imagery is maintained.

How imagery is used in conjunction with other geographic data depends on the problem to be solved. Many different

clients can use imagery from ArcGIS Server, including ESRI's ArcGIS software (a wealth of desktop, Web, and mobile applications), as well as products built for specific tasks. For image and geospatial analysts, ENVI software from ITT Visual Information Solutions (ITT VIS) allows traditional image analysis in a

GIS workflow. It extends ArcGIS users' capabilities to analyze imagery in both traditional and GIS environments.

### Sophisticated Image Analysis for GIS

In the past, image analysis has been perceived to be complicated and generally used by those who are well-versed in the latest spectral image processing and analysis technology. Many image analysis tools have been available for the visualization and analysis of spectral imagery for some time, but the learning curve has

often been too steep for many professionals. GIS analysts are traditionally well versed in the analysis of geospatial information but have often used imagery only as a backdrop or for hand-digitization purposes to update data layers in a GIS.

Recently, there has been a move in the remote sensing software world to provide tools and workflows that are beneficial to GIS analysts who are looking to imagery for new ways to add timely, meaningful information to projects. In light of this growing trend, ESRI and ITT VIS have worked together to integrate their respective software technologies, ArcGIS and ENVI, to meet the need for adding imagery to GIS workflows.

This ArcGIS and ENVI integration opens up the world of image analysis. "The relationship between ITT and ESRI is making it much easier for users to combine GIS and imagery in order to make authoritative decisions," says Lawrie Jordan, director of enterprise image solutions, ESRI. The integration of the ITT and ESRI technologies is now available in ENVI 4.7 and a new product from ITT designed specifically for GIS professionals called ENVI EX.

The new integration allows users to exchange data and files from ArcGIS to ENVI easily with simple drag-and-drop methods that preserve the style, symbology, vectors, and layer information from one interface to another. ArcGIS workflow integration and map generation capabilities are now also available from within ENVI products.

In addition to the integration with ArcGIS, ENVI EX also provides new users with access to the methods and algorithms that image scientists have been using for

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# “ ENVI EX PROVIDES AUTOMATED WORKFLOWS FOR SOLVING PROBLEMS THAT ARE COMMON IN GIS APPLICATIONS ACROSS A VARIETY OF INDUSTRIES, INCLUDING THE EXTRACTION OF FEATURES OR OBJECTS FROM IMAGE DATA, DETECTION OF CHANGE OVER TIME, AND CLASSIFICATION AND MAPPING OF IMAGE DATA. ”

years in automated workflows that don't require the traditional steep learning curve. The ENVI EX interface is easy to use and guides users through the analysis of satellite and airborne imagery in a step-by-step manner. ENVI EX provides automated workflows for solving problems that are common in GIS applications across a variety of industries, including the extraction of features or objects from image data, detection of change over time, and classification and mapping of image data.

## Increased Productivity and Accuracy

“Our development of ENVI EX and the integration with the ESRI platform has allowed us to simplify imagery analysis without compromising the accuracy of the results,” says Richard Cooke, president, ITT VIS. “And, the ability to find and identify features in imagery allows users to get meaningful and timely information from imagery quickly and easily.”

To save valuable time processing and reprocessing entire image scenes, interim results in ENVI EX workflows can be fine tuned with the help of a preview window that gives on-the-fly results during each stage of the workflow before processing even begins. The workflows also allow the user to move back and forth between each step, allowing modifications to previous steps that may not have been apparent at first.

Tools and workflows are also available

to simplify the visualization and interpretation of image data. For example, the GeoLink to ArcMap feature in ENVI EX allows users to simultaneously pan and zoom around an image with side-by-side windows of ArcGIS and ENVI EX, making image analysis more efficient and productive, particularly when trying to verify the accuracy of information of a certain location between applications.

Integrated workflows that focus on ease of use save organizations time and money by allowing users to get up and running quickly and by providing accurate results. Image analysis workflows are available in application areas that are important to GIS professionals and can be used to solve common problems across government, mapping organizations, oil and gas, agriculture, asset management, and many other industries.

## Data Support and Interoperability

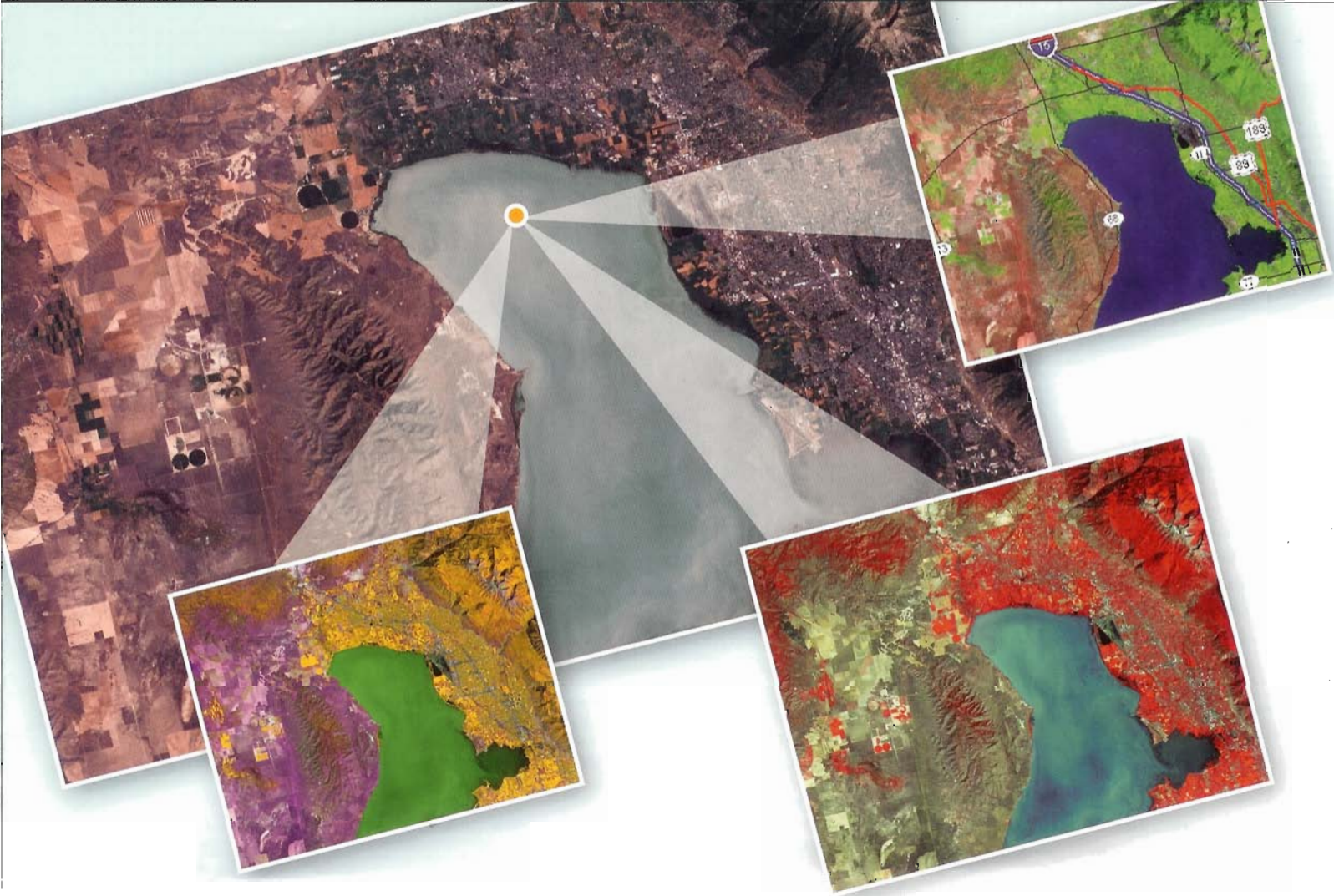
Data support is key for image analysis, as there are many different types of data available from satellite and airborne sensors, including panchromatic, multispectral, hyperspectral, radar, thermal, lidar, and more. It is important that image analysis applications support the wide variety of data types available so that the user has access to the imagery sources possible for a particular project.

ENVI EX supports ArcGIS image services, as well as more than 70 data formats including J2K, GeoTIFF, and

## ESRI AND ITT PARTNER

ITT VIS and ESRI have created a transactional platform that allows users to fully exploit imagery. The ability to apply complex image analysis to the vast amounts of imagery available makes imagery applicable to any geospatial workflow. ArcGIS and ENVI EX bring the image management, processing, and analysis necessary to handle complex modeling and to incorporate hard science into everyday tasks. Fast, dynamic image dissemination and analysis have come of age. For more information, visit [www.esri.com/imagery](http://www.esri.com/imagery) or [www.itvis.com/envi](http://www.itvis.com/envi).

optional JITC-compliant NITF data. Image services incorporated in ArcGIS Server also support a large range of Web standards including WMS, WCS, KML, SOAP, and REST. These types of data support and interoperability allow users to be more efficient and effective when incorporating imagery into their workflows. ❖



# Maximize the Value of Your Imagery

Quickly get imagery to people who need it with the ArcGIS® Server Image extension.

*"When we tested ArcGIS Server Image extension, we found designers, technicians, and digitizers were all very pleased with the processing time. It was twice as fast, in some cases even faster, than previous systems."*

Cindi Salas  
GIS Manager  
CenterPoint Energy

The ArcGIS® Server Image extension helps organizations manage large catalogs of rasters and imagery to make imagery available to more people in less time. Dynamic mosaicking and on-the-fly image processing allow users to quickly serve multiple imagery products from one set of source imagery, reducing data redundancy and storage requirements.

For more information, visit [www.esri.com/image](http://www.esri.com/image)  
or call 1-888-373-1353.

For ESRI locations worldwide, visit  
[www.esri.com/distributors](http://www.esri.com/distributors).



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