ITT

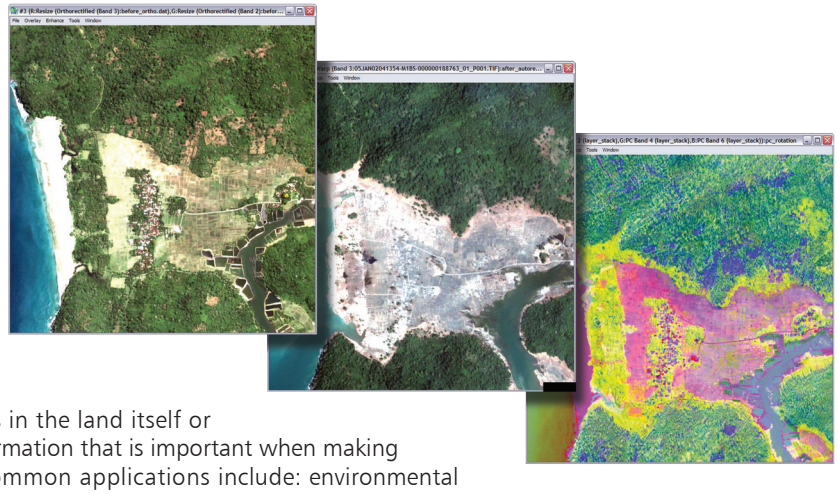
Visual Information Solutions

ENVI EX | Change Detection Workflow

Geospatial imagery is more than just a pretty picture or a backdrop to a map. Today, it is used to provide specific information about a geographic area of interest and can help you make decisions that are important in your line of work.

ENVI EX is the newest addition to the ENVI line of premier image processing and analysis software products. It provides user-friendly tools to read, explore, prepare, analyze, and share information extracted from all types of imagery. Designed specifically for GIS users and fully integrated with ESRI's ArcGIS® software, ENVI EX includes unique step-by-step workflows that walk you through previously complex image analysis tasks.

What is Change Detection?



Change detection has become an essential task for image analysts and GIS professionals across industries and disciplines. Today, satellite imagery and other geospatial information can help us understand and identify the changes that have occurred in a geographic area of interest over time.

Detecting change – either changes in the land itself or objects on the land – provides information that is important when making decisions that affect land use. Common applications include: environmental monitoring, such as deforestation; asset management, such as the number of oil wells on a property; and urban development, such as the number of buildings that have been added to a commercial area over a time span.

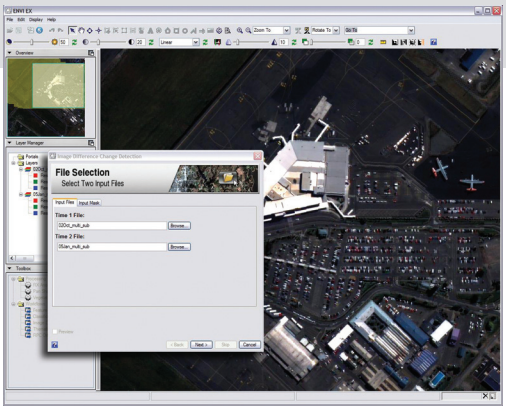
Change Detection in ENVI EX

Manually detecting change by visually comparing images, or analyzing images pixel by pixel, can be labor intensive and time consuming and can lead to misidentification and other inadvertent errors. Now, the automated workflow for detecting change in ENVI EX guides you through identifying the type and extent of changes that have taken place.

ENVI EX includes intuitive dialog boxes that walk you step-by-step through the workflow and can be used with raw images or images that have been classified by the various types of land cover they contain. The workflow is powerful as well as flexible, giving you the option of using data from different types of sensors taken on different days, or at various times during a single day. Final results are easy to obtain, and can be used to create reports that include analytics such as percentages. You can also overlay raw images with pertinent results in order to accurately highlight the extent of the change in the area.

The ENVI EX change detection workflow simplifies the process for you to identify changes using geospatial imagery. And, ENVI EX provides flexibility within the workflow to modify parameters and data at any stage of the process, allowing you to get the specific information you need from your imagery and make more informed decisions.

Change Detection with ENVI EX



Select the Two Images You Want to Analyze

Select two images of the same scene (even if they were taken with different sensors) from web or local search results, from ArcGIS, or from Windows® Explorer and simply drag and drop them into ENVI EX. ENVI EX supports imagery from today's most popular satellite and airborne sensors, and it can classify files in over 70 types and formats.

Choose a Change Detection Method

The ENVI EX workflow allows you to choose either an image difference or thematic change method. The change detection method you choose will be based on whether you have raw images or images that have already been processed and classified.

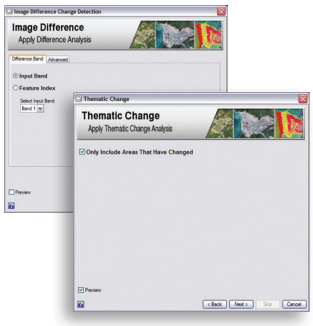


Image Difference Method

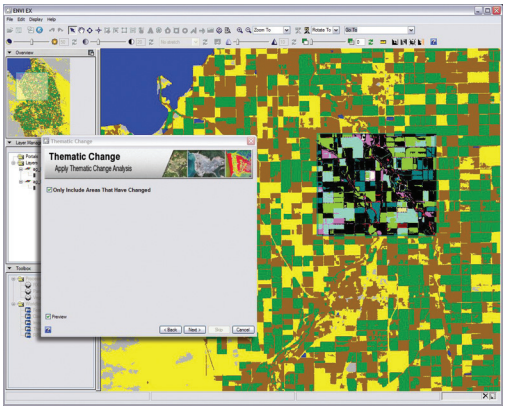
Choose the image difference method to compare differences between two images of the same location. For example, ENVI EX will detect and highlight the differences between a "before" image and an "after" image.

Thematic Change Method

Choose the thematic change method to compare previously classified images to detect changes in specific features over time, such as buildings, roads, or natural land cover. This method will highlight changes that have occurred within those "classes." For example, ENVI EX will detect changes in areas that are classified as "trees" in one image and "ground" in another.

Change Thresholding

Selecting the change threshold option will enable you to set parameters to identify the magnitude and type of changes that have occurred. At any time, you can also use the ENVI EX preview portal window to view your preliminary change detection results without the need to process the entire dataset. This saves you time and gives you the ability to modify results on-the-fly by changing input data as often as necessary until you achieve your desired outcome.



Cleanup of the Data

During the optional clean-up step of the change detection workflow, you can choose to apply smoothing and aggregation tools that refine results and make features appear more visually realistic.

View, Export, and Use Results

There are many ways you can use your results. Export the change detection results and statistics to a printer, include them as part of a PowerPoint presentation, or save them to your computer, a geodatabase, or directly into an ArcGIS file to create a map. Additional analysis of the results can also be done using ENVI EX or ArcGIS.

ENVI **EX**

Unlock the information in your imagery. From reading and preparing, to exploring, analyzing, and sharing – you'll get information from imagery quickly and easily with the automated ENVI EX workflows. Learn more about ENVI EX at **www.ittvis.com/ENVIEX** or call **303.786.9900**, and ask for your ENVI representative.