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ENVI® SARSCAPE®

Process, analyze and solve problems with SAR data

THE PROLIFERATION OF SAR DATA

Synthetic Aperture Radar (SAR) is used around the world due to its many benefits such as its ability to capture data at night and see through cloud cover, dust and smoke. SAR can image a surface through vegetation, soil and ice and can easily measure height and displacement. Because of this, there are many applications where SAR can provide critical information about an area or objects of interest – complimenting optical imagery.

There are currently a large number of orbital SAR instruments, with more being built all the time. An increase in free and publicly available SAR data has resulted in a significant growth in data coverage and accessibility. As a result, SAR data is being used to solve problems across a wide range of disciplines including disaster preparation and response, urban development and land use, agriculture, change detection and monitoring across land and sea.

SAR PROCESSING AND ANALYSIS WITH ENVI SARSCAPE

For decades, L3Harris and sarmap SA have teamed up to provide ENVI SARscape, making the benefits of SAR data available to everyone. ENVI SARscape allows you to easily process and analyze SAR data for applications like surface deformation mapping or land cover/land use monitoring, while giving you the option to integrate this information with other geospatial products. This unique data analysis capability turns your data into meaningful insights and answers.

Since ENVI SARscape is integrated with ENVI – the premier image processing and analysis solution – you get the added benefit of image analysis tools and SAR processing functionality in one package.
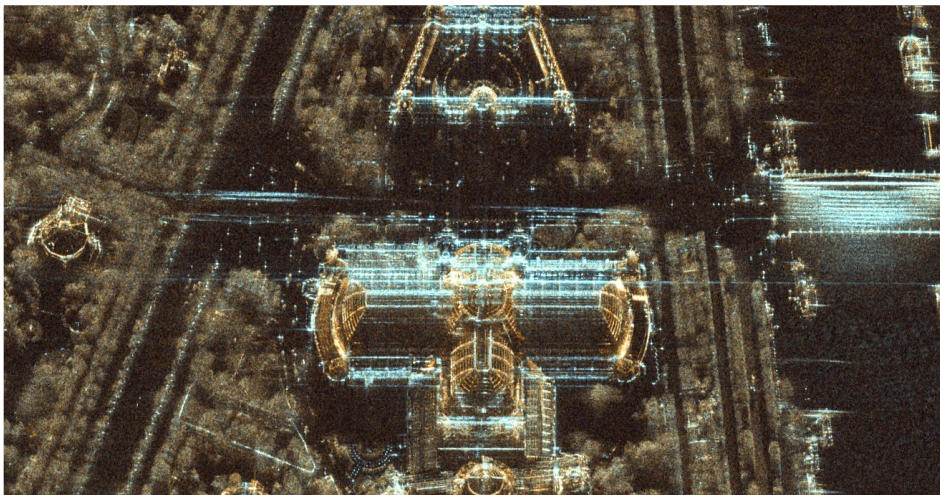
This image is a color composite of the Grand and the Petit Palais in Paris, France. The source image is COSMO-SkyMed Second Generation, processed using ENVI SARscape by e-GEOS.
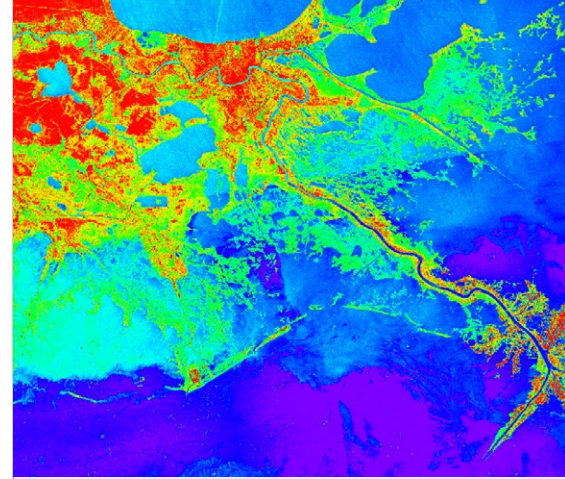
ENVI SARSCAPE IS THE INDUSTRY STANDARD:

> Use technology developed by SAR experts and proven over time

> Easily ingest SAR data and prepare it for analysis

> Quickly view, observe, monitor and extract information about an area

> Access image analysis tools and SAR processing in one package

> Solve problems across a wide variety of applications

> Accurately and efficiently analyze data at scale

> Utilize all aspects of SAR data to increase knowledge

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THE INTEGRATION OF ENVI AND ENVI SARSCAPE

ENVI is the industry standard for image processing and analysis. It is used by image analysts, GIS professionals and scientists to extract timely, reliable and accurate information from geospatial data and imagery. ENVI has remained on the cutting edge of innovation for more than three decades due in part to its support of all types of data including multispectral, hyperspectral, thermal, LiDAR and SAR.

DATA SUPPORT AND PROCESSING

ENVI SARscape works with all commercially available SAR data as well as many non-commercial SAR data sets including Sensor Independent Complex Data (SICD). ENVI SARscape works with any size data and has automated tools to quickly and easily prepare SAR data for viewing and further analysis.

A lot of time and effort can be spent making SAR data ready for analysis. However, built-in tools and workflows in ENVI SARscape make it easy to ingest data and prepare it for analysis. This means more time can be spent on the data itself and solving problems.

Powerful tools such as the De Grandi Spatio-Temporal filter are great for reducing noise and speckle, and automatic co-registration makes processing workflows fast and easy. Plus, ENVI SARscape's support of cloud and enterprise environments means users can take advantage of modern hardware and efficiently and accurately analyze data at scale.

PRODUCE GEOSPATIAL PRODUCTS

It is easy to create products and derive insights and answers with ENVI SARscape. These products could include a time series analysis plot of agricultural growth, tracking surface changes for a report, detecting and mapping a harmful spill and much more.

BENEFITS OF ENVI SARSCAPE AND ENVI INTEGRATION INCLUDE:

> Easy-to-use interface

> Seamless use on both the desktop and enterprise environments

> Access to pre-built workflows

> Fusion of optical and SAR data to exploit the strengths of each data type

> The use of ENVI Modeler to easily perform batch processing and create custom workflows

> Access to ENVI SARscape tools within ArcGIS®

ENVI SARscape was used to perform time series analysis of an oil facility near Green Village, Syria. The results depict tire tracks in the sand that are unobservable with optical data. The source image is Sentinel-1, processed using ENVI SARscape by sarmap SA.
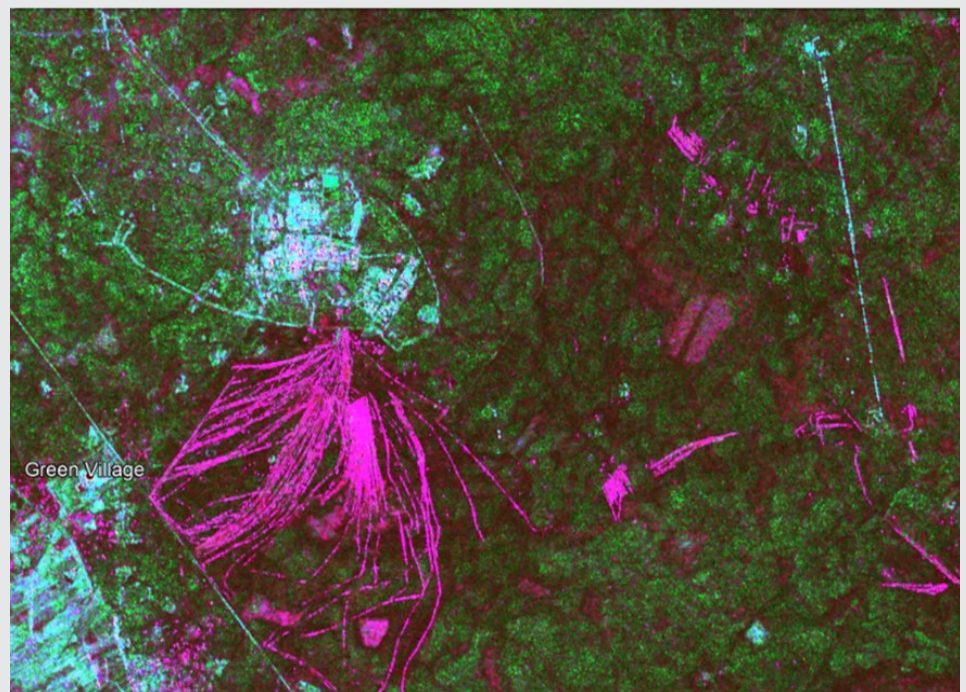
MAXIMIZE THE BENEFITS OF AMPLITUDE AND PHASE

SAR data provides not only amplitude or the intensity of the backscatter response but also phase, which allows for measurement of height and displacement – a unique benefit to SAR. ENVI SARscape has tools to extract information from both the amplitude and phase, which enables users to fully utilize all aspects of SAR data to increase knowledge about areas of interest.

With ENVI SARscape, you can use the amplitude information of SAR data captured at different times over the same area to understand surface changes. Since SAR data is minimally influenced by the atmosphere, analyzing change is immediate and very efficient. Amplitude can be used to pick up physical information on the surface and is commonly used for agriculture, forestry and feature monitoring.

ENVI SARscape integrates point and area-based analysis techniques to measure displacement and deformation over time. Using the phase provides the ability to see miniscule surface changes that are impossible to see otherwise. This approach makes it possible to analyze deformation that affects both extended and localized structures related to natural or man-induced phenomena. Applications include analyzing volcanic or seismic activity, landslides, subsidence and building failures.

With ENVI SARscape, you can accurately process every type of SAR data in every way. This includes amplitude, single and multi-polarization, phase, a single SAR image or a stack of images. This allows you to easily view, observe, monitor and automatically extract information about an area as needed.

Get the information you need from SAR data.
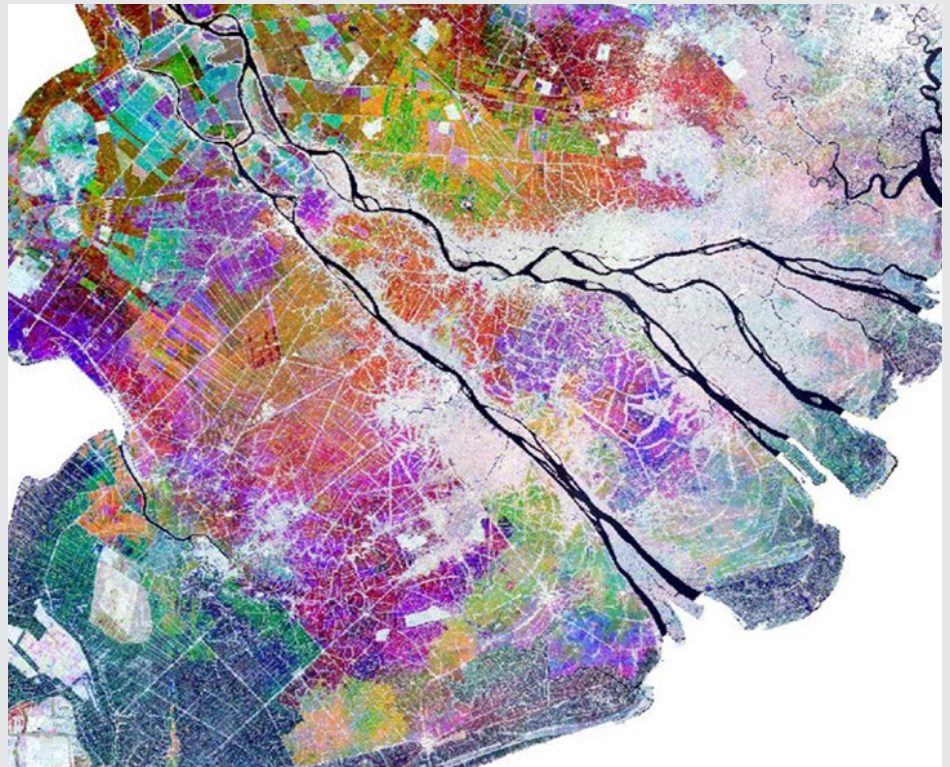
This multi-temporal false color composite of the Mekong River, located in Southeast Asia, shows different stages of crop growth. The source image is Sentinel-1, processed using ENVI SARscape by sarmap SA.
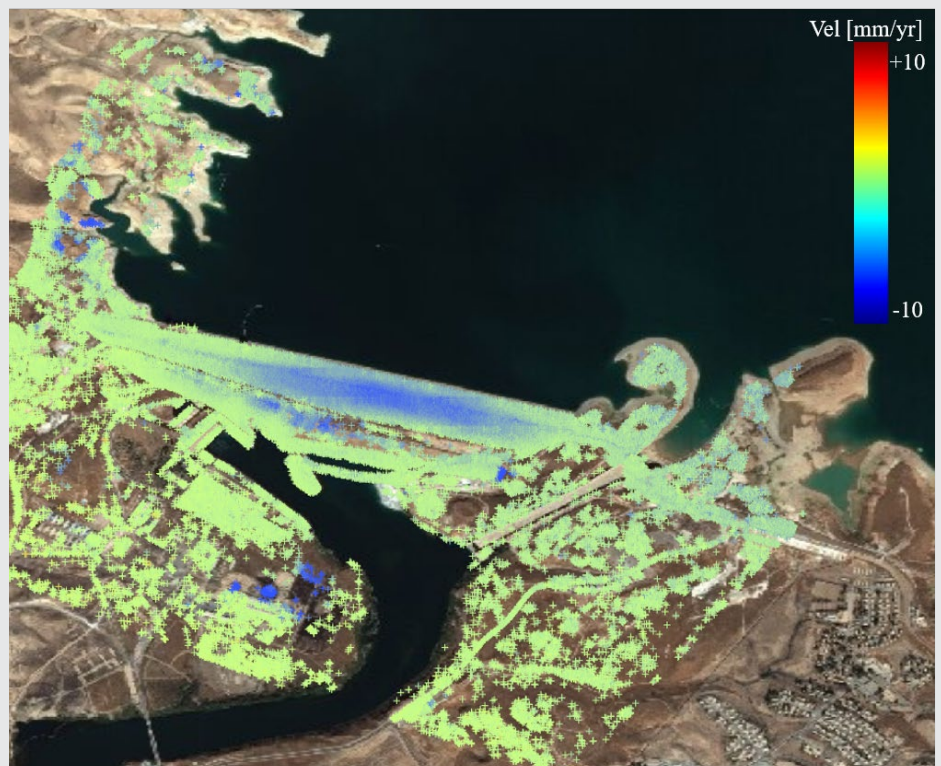

This image depicts the average displacement rate (color scale between -10 and +10 mm/year) at the Mosul Dam in Iraq. The source image is COSMO-SkyMed, processed using ENVI SARscape by sarmap SA.

# SAR ANALYSIS. SEEING IS BELIEVING.

The versatile nature of SAR data and the power of ENVI SARscape make them extremely useful across a wide-variety of applications. And, recent advances in SAR sensors have improved spatial resolution, revisit time, swath width and polarimetric capability. Here are several example applications of SAR data and ENVI SARscape.

LANDSLIDES
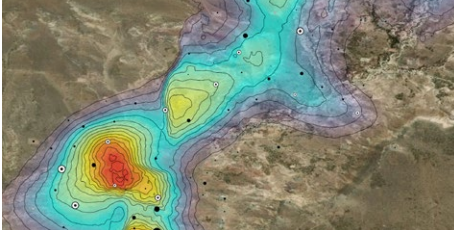
Map and measure surface movement caused by human activity or from natural causes.

GLACIERS AND PERMAFROST
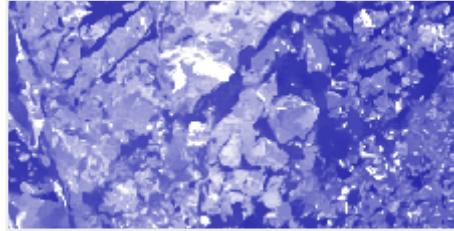
Distinguish moving from non-moving glaciers and map and monitor their movement.
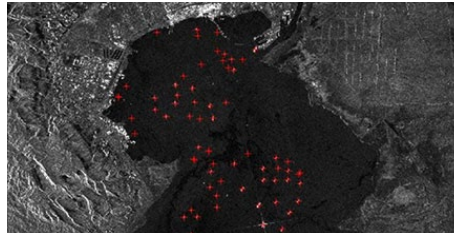
OIL SPILLS

Detect and monitor oil spills and map their extent.

SUBSIDENCE

Monitor surface subsidence to understand the effects of tectonic and human activities.

SHIPPING

Detect and identify ships (including dark vessels and semi-submersibles) and perform maritime surveillance.

AGRICULTURE

Measure plant health, growth and biomass even in areas with frequent rain and cloud cover.

DEFORESTATION

Monitor and calculate deforestation and forest degradation and analyze the impact.

FLOODING

Gather timely information and calculate flood extent to respond to and mitigate effects from floods.

ACTIVITY MONITORING

Understand activity patterns and changes to the patterns to support Activity Based Intelligence (ABI).

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