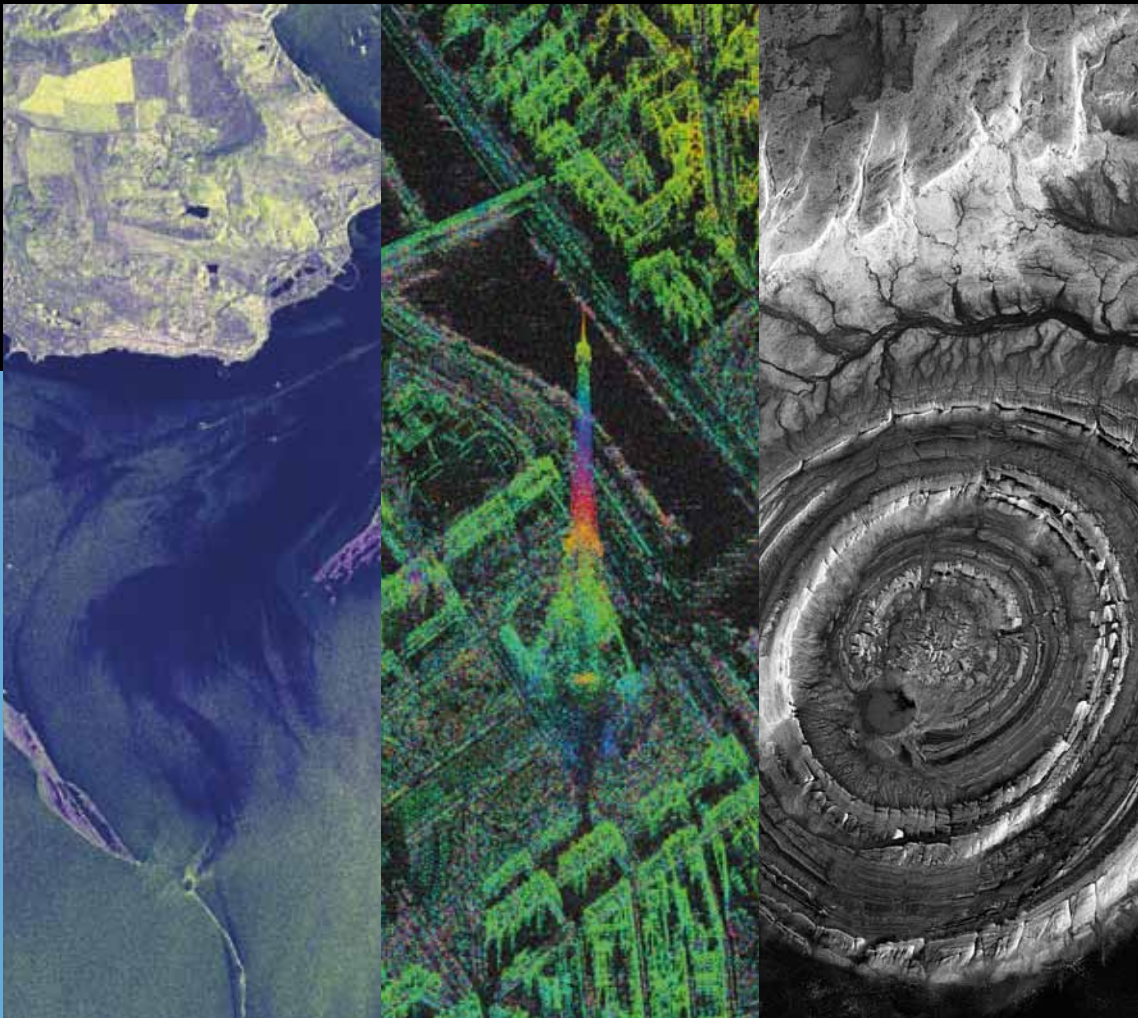


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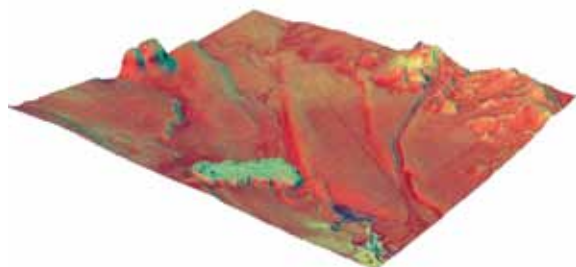
SARscape

Process, analyze and generate products from SAR data.



CREASO - your partner for visual information solutions

Easy to Use Tools. Proven Functionality. Fast Results.



DEM, based on TerraSAR-X-1 StripMap, Bolivia. ©TerraSAR-X-1 data, Infoterra

The use of Synthetic Aperture Radar (SAR) data has become increasingly popular in recent years, offering professionals in a wide array of industries a measurable, analytical approach to getting information about an area or object of interest. SAR data, acquired from airborne and spaceborne platforms, enable to generate two or three-dimensional products of Earth's surface. When combined and merged with other data, SAR often adds critical information to your analysis.

Get the Information You Need from Your SAR Data

The SARscape® modules allow you to easily read, process, analyze your SAR data, and generate products, while giving you the option to integrate this information with other geospatial products. This unique data analysis capability takes your data from hard-to-interpret numbers to meaningful, contextual information. And, since SARscape modules are integrated with ENVI®, you have the added benefit of image analysis tools and SAR processing functionality in one package.

Basic Module

The Basic Module includes a set of processing steps for the generation of SAR products based on intensity and coherence. This module is complemented by:

- **Focusing Module**
Supports ERS-1/2 SAR, JERS-1 SAR, ENVISAT ASAR, and ALOS PALSAR-1 data.
- **Gamma & Gaussian Filter Module**
Includes SAR specific filters, extending the range of filters of the Basic Module.

Interferometry Module

The Interferometry Module supports the processing of Interferometric SAR (2-pass interferometry, InSAR) and Differential Interferometric SAR (n-pass interferometry, DInSAR) data for the generation of Digital Elevation Models, Coherence, and Land Displacement / Deformation maps. This module is complemented by:

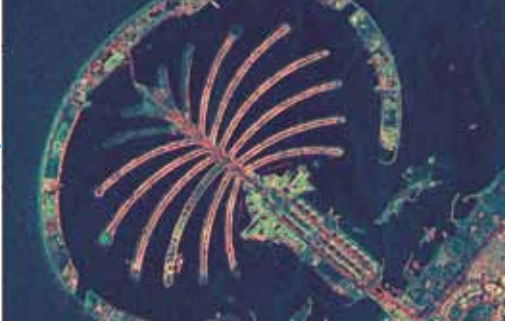
- **ScanSAR Interferometry Module**
Offers the capabilities to process InSAR and DInSAR data over large areas (400 by 400 km).
- **SAR Polarimetry / Polarimetric Interferometry Module**
Supports the processing of polarimetric and polarimetric interferometric SAR data.
- **Interferometric Stacking Module**
Based on Small Baseline Subset (SBAS) and Persistent Scatterers (PS) techniques, it enables to determine displacements of point- and distributed-targets.

Cover Pictures:

Left: Oil spills in the Black Sea, TerraSAR-X-1 StripMap. ©Infoterra

Center: Interferogram of the Eiffel Tower, Paris, TerraSAR-X-1 High Resolution Spotlight. ©DLR

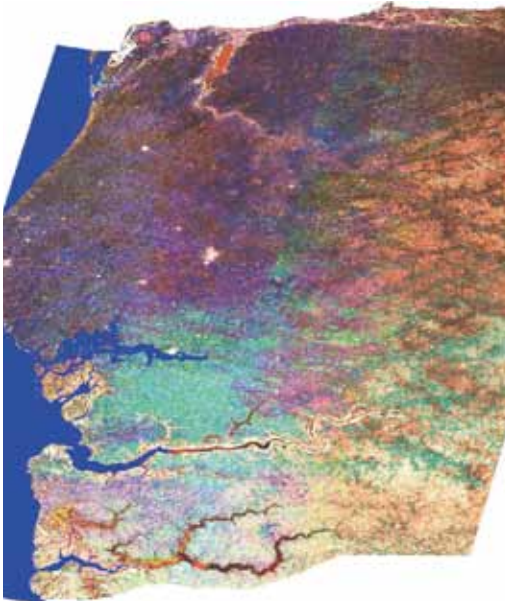
Right: Ring Structure Guelb er Richat, Mauretania, TerraSAR-X-1 ScanSAR. ©Infoterra



False colour composite of Palm Island (Jumeirah), Dubai, TerraSAR-X-1 StripMap. ©Infoterra

SARscape Basic Module

SARscape Basic Module includes processing functionality for generating airborne and spaceborne SAR products, based on intensity and coherence. This is complemented by a multi-purpose tool, which includes a wide range of functions - from image visualization, to Digital Elevation Model import and interpolation, to cartographic and geodetic transforms.



Multi-temporal mosaic of Senegal, 180 ENVISAT ASAR images.
©ASAR data, ESA

Prepare Your SAR Imagery

SARscape provides automated pre-processing tools that allow you to quickly and easily prepare your imagery for analysis and visualization. With SARscape Basic following processing capabilities are supported:

- Multilooking
- Coregistration
- Despeckling
- Geocoding and Radiometric Calibration
- Mosaicking
- Feature Extraction
- Segmentation
- Classification

In addition, as a SARscape Basic Module user, you have the choice of two accessory modules:

Focusing Module

The Focusing Module generates complex images (SLC) based on a ω -k frequency domain algorithm. It supports ERS-1/2 SAR, JERS-1 SAR, ENVISAT ASAR and ALOS PALSAR-1 data.

Gamma and Gaussian Filter Module

The Gamma and Gaussian Filter Module includes a whole family of SAR-specific filters, extending the range of filters of the Basic Module. The algorithms are based on Gamma and Gaussian-distributed scene models. They are particularly efficient to reduce speckle noise, while preserving the radar reflectivity, the textural properties and the spatial resolution, especially in strongly textured SAR images.

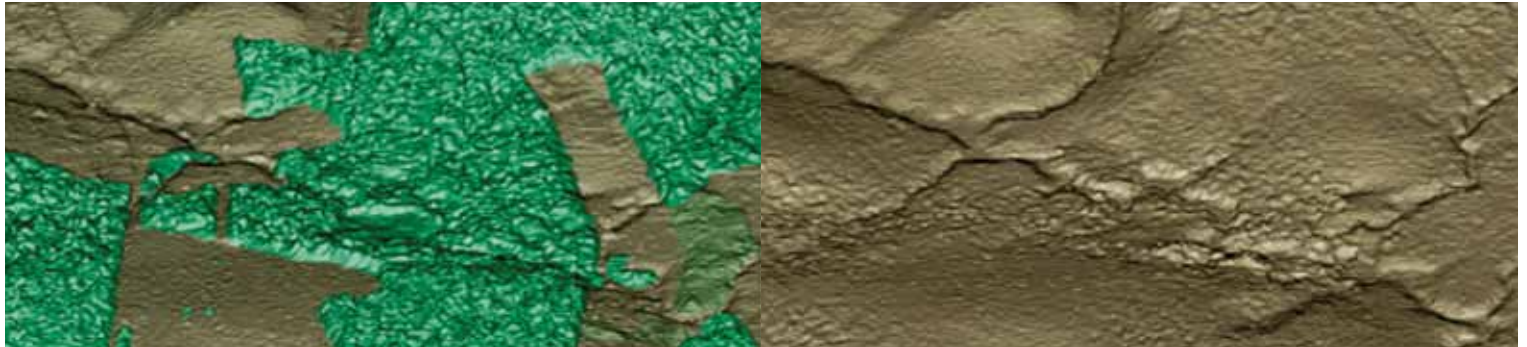


Intensity image, OrbiSAR-1 X-band, Switzerland.
©OrbiSAR-1 data, Orbisat

SARscape Interferometry (InSAR/DInSAR) Module

This module enables the generation of Digital Elevation Models (InSAR technique) and surface deformation maps (DInSAR technique). State-of-the-art methodology, applied to data acquired from recent SAR sensors, allow generating accurate (up to a vertical resolution of few meters) and detailed surface and terrain height products.

The DInSAR technique can detect centimeter-scale displacements over time spans of days to years. It has applications for geophysical monitoring of natural hazards, for example earthquakes, volcanoes and landslides, and also in structural engineering, in particular monitoring of subsidence and structural stability.



Digital Surface Model (left) and Digital Terrain Model (right), based on OrbiSAR-1 X- and P-band, Amazonas region, Brazil. ©OrbiSAR-1 data, Orbisat

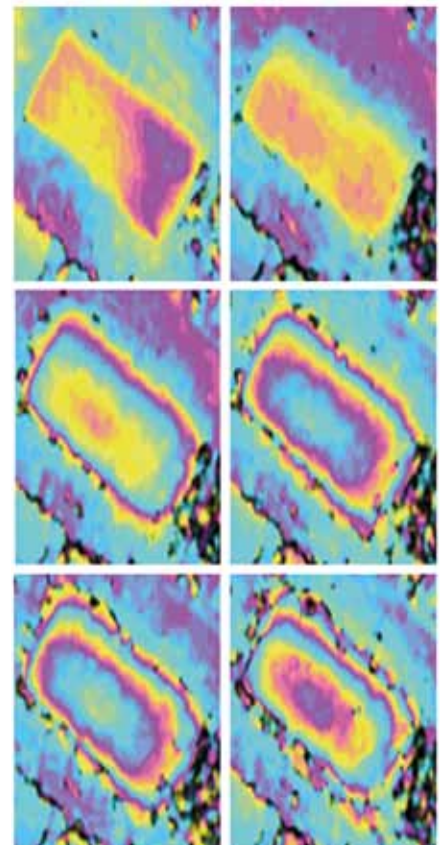
Generate Your Interferometric Products

The SARscape Interferometry Module allows you to process Interferometric SAR (2-pass interferometry, InSAR), and Differential Interferometric SAR (n-pass interferometry, DInSAR) data.

The processing includes the following steps:

- Co-registration using DEM data
- Interferogram generation
- DEM flattening
- Interferogram adaptive filtering and coherence
- Phase unwrapping
- Phase editing
- Geometry optimization, based on Ground Control Points
- Phase to map conversion and geocoding (DEMs)
- Phase to displacement conversion and geocoding (displacement maps)

The three accessory modules ScanSAR Interferometry, SAR Polarimetry / Polarimetric Interferometry, and Interferometric Stacking, complement the InSAR/DInSAR Module.



Filtered interferograms (every 11 days) of a building in Barcelona, TerraSAR-X-1 StripMap, 1 fringe ~1.55 cm displacement. ©TerraSAR-X-1 data, Infoterra

ScanSAR Interferometry Module

The ScanSAR Interferometry Module allows you to generate Digital Elevation Models, Coherence and Land Displacement maps based on ENVISAT ASAR Wide Swath data (400 x 400 km). In addition, this module provides also hybrid interferometric products, by combining StripMode (ASAR Image Mode) data with ScanSAR (ASAR Wide Swath) data.

SAR Polarimetry/Polarimetric Interferometry (Pol/PolInSAR) Module

The SAR Polarimetry/Polarimetric Interferometry (Pol/PolInSAR) Module allows you to process polarimetric data and polarimetric interferometric ALOS PALSAR-1, RADARSAT-2, TerraSAR-X-1/2 data.

- **SAR Polarimetry**
Includes among others Pauli Decomposition, Entropy-Anisotropy-Alfa Decomposition and Classification.
- **Polarimetric SAR Interferometry**
Includes among others SLC Coregistration, Polarimetric Phase Difference, Interferogram Generation, Polarimetric / Interferometric Coherence, and Coherence Optimization.

Interferometric Stacking Module

The Interferometric Stacking module integrates point-based (PS-like) and area-based (SBAS-like) techniques for the processing of interferometric stacks. This combined approach enables to obtain accurate results both on point- and distributed-targets.

- **Persistent Scatterers (PS)**
Enables to detect very small displacements (mm scale) and to infer the deformation velocity - and its variation over the time - in particular for very stable (man-made) reflectors that might have independent displacements respect to the surrounding areas.
- **Small Baseline Subset (SBAS)**
Is a complementary method that exploits differential synthetic aperture radar interferometry (DIFSAR) techniques to analyze stacks of SAR acquisitions to extract small deformations over large areas, where no point targets might be identified but large, correlated displacements occur over natural targets.

The combination of the two approaches allows analyzing deformation phenomena affecting both extended area (e. g. natural features) and localized structures (e. g. man made features), related to natural or man-induced phenomena (e. g. volcanic or seismic activity, landslides, subsidence, building failures, etc.).



PS analysis of Las Vegas, U.S., ENVISAT ASAR Image Mode.
©ASAR data, ESA

Get started using SARscape at
www.creaso.com/SARscape.htm



C R E A S O



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Our Job Doesn't End with Great Software

Support, training, and consulting are important cornerstones for reaching our mutual goal - your success.

We advise you in all questions related to data analysis and visualization, in trainings courses at your site or in our training center, in the scope of projects we initialize together with you or carry out completely. Our team of trained engineers and scientists is looking forward to you and your tasks.

Let us get into conversation!

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