Figure 1: Digital Surface Model generated from SPOT-7 stereo-data and corresponding land displacements derived from SAR differential interferometry.

ENVI® OPTICALSCAPE

ENVI Opticalscape generates Digital Surface Models (DSMs) and orthorectified images from spaceborne and UAV data while giving users the industry leading tools for imagery exploitation and data fusion.

CREATE DSMs AND ORTHORECTIFIED IMAGES FROM SPACEBORNE AND UAV DATA

BENEFITS

Process optical stereo and tri-stereo imagery to generate DSMs and ortho images

Automated ortho image mosaicking

Fuse Opticalscape and SARscape products

UAV MODULE

Opticalscape UAV processes optical stereo images to create orthorectified mosaic images while correcting for sensor orientation. The DSM generation is based on the most advanced algorithms and automated ortho image mosaicking. To facilitate the image orientation, images must include a coarse platform position, however, attitude data are not mandatory. Supported are panchromatic, RGB, and multiband digital cameras with integrated GPS.

SPACEBORNE MODULE

Opticalscape Spaceborne processes optical stereo and tri-stereo images acquired from satellites for the generation of DSMs and ortho images. Supported sensors include Cartosat, GeoEye, Ikonos, QuickBird, Pléiades, Spot, SuperView and WorldView.

Both modules are complemented by a multi-purpose tool that includes a wide range of functions from image enhancement and visualization to cartographic and geodetic transforms. Products generated from Spaceborne and UAV modules can be further processed and analyzed with many ENVI workflows, for example the LIDAR and topographic tools.

FUSION OF OPTICALSCAPE AND SARSCAPE PRODUCTS

Opticalscape and SARscape fuse DSM data generated from SAR-Optical, Optical-Optical, and SAR-SAR sensors. This data fusion is unique and greatly improves the accuracy of the final DSM product, the fusion considers the sensor characteristics rather than simply averaging the different heights (Figure 3). Several fusion algorithms can be selected: 'DEM Fusion Weighted Average' combines DSMs based on pixel resolution and/or reliability. 'Wavelet Combination DEM' performs a wavelet-based fusion process between the two input DSMs. 'Point Cloud DEM Fusion' combines DSMs in the form of point clouds into a single raster product.

HARRIS® TECHNOLOGY TO CONNECT, INFORM AND PROTECT™

SPACEBORNE MODULE

- Relative orientation of stereo and tri-stereo imagery based on RPC parameters
- Ground control point and tie point extraction
- Bundle adjustment for exterior orientation
- Matching mask generation for water surfaces and dead zones
- Automated DSM generation (output as raster or point cloud)
- Generation of orthorectified images

UAV MODULE

- Data import including distortion correction and band alignment
- Ground control point and tie point extraction
- Bundle adjustment for exterior orientation
- Wallis filtering
- Automated DSM generation (output as raster or point cloud)
- Generation of orthorectified mosaics

DEM FUSION

- DEM transformation (resampling)
- Fusion based on weighted averages
- Wavelet based fusion process
- Combination of DEMs in point cloud format

APPLICATIONS OF OPTICALSCAPE PRODUCTS

Products generated from the Spaceborne and UAV modules can be used within ENVI SARscape Basic, ENVI SARscape Interferometry, and ENVI SARscape Interferometry Stacking modules to enhance the quality and the level of detail of the final SAR products.

High-resolution spaceborne or UAV DSMs can be ingested into SARscape Interferometric Stacking module to derive precise land displacement maps (Figure 1). The integration of Opticalscape and SARscape Basic Geocoding improves the geometric correction of image distortions caused by topography, image orientation, or sensor attitudes (Figure 2).
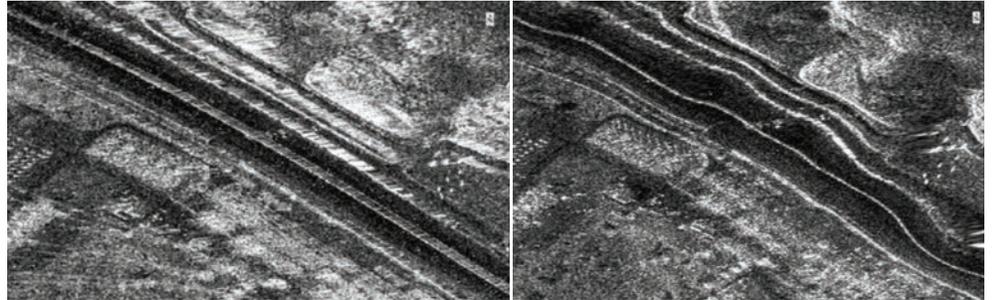

Figure 2: Georeferenced COSMO-SkyMed image (3 meter) using DSM (1 meter), based on Pléiades stereo images (left) and SRTM DEM (30 meter, right).
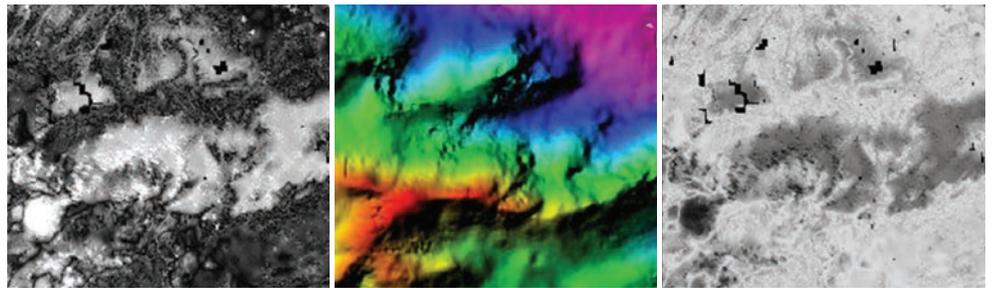

Figure 3: Fusion of DSM data from SAR-Optical sensors. Fused DSM (center), weights map of the ALOS PALSAR-1 DSM (left) and weights map of the SPOT-5 DSM (right).

FOR MORE INFORMATION:

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About Harris Corporation
Harris Corporation is a leading technology innovator, solving customers' toughest mission-critical challenges by providing solutions that connect, inform and protect. Harris supports government and commercial customers around the world. **Learn more at harris.com.**

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