




ENVI[®] SARscape[®] Release Notes

Version 5.7.0

June 2023

What's New in SARscape® 5.7.0

June 2023

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1 What's new

The newest release of SARscape – version 5.7.0 – introduces new features, improvements and bug fixing.

Note that SARscape 5.7.0 is fully compatible with ENVI 5.7.0 and with new NV5 Next-Generation Licensing system, the minimum supported version of ENVI is 5.6.0

1.1 Highlights

The most meaningful developments are listed here below:

- E-PS: The Enhanced - PS technique identifies Distributed Scatterers and Permanent Scatterers pixels to improve the InSAR pixel coverage over rural areas by implementing adaptive filtering on the interferometric phase. The typical level of detail of the PS displacement time series is applied to DS pixels too.
- E-SBAS: Permanent Scatterers pixels are identified and processed together with Distributed Scatterers pixels. Providing a more comprehensive and valuable output. E-SBAS is capable of measuring Non-Linear displacement trend to both PS and DS pixels.

1.2 New Features

1.2.1 Import Data/SAR Spaceborne/Single Sensor/EOS-04

Preliminary support of the data acquired by the EOS-04 C-Band SAR satellite.

- The supported products are:
- CRS Coarse Resolution ScanSAR Mode, Ground Range.
- MRS Medium Resolution ScanSAR Mode, Ground Range.
- FRS-1 Fine Resolution Mode, Single Look Complex or Ground Range.

The use of a ground control point is necessary to achieve a precisely georeferenced image.

1.2.2 Import Data/SAR Spaceborne/Single Sensor/LuTan-1

Preliminary support of the data acquired by the LuTan-1 L-Band SAR satellite.

The supported products are SLC Stripmap single and full polarization. The import process has been validated using a small dataset and an uncompleted parameter descriptions. For this reason, calibration might have issues.

The geolocalization is fairly precise, there is a slight variation along the azimuth direction, this variation is likely due to orbital state vectors inaccuracies. The interferometry flattening is affected as well, showing residuals fringes patterns along the azimuth direction.

1.2.3 Import Data/SAR Spaceborne/Single Sensor/SV-2

Preliminary support of the data acquired by the SV-2 X-Band SAR satellite.

The supported products are SLC Stripmap single and full polarization. Currently, support is guaranteed and validated only for the Stripmap mode, while significant geocoding issues have been experienced with the Spotlight mode, making its use discouraged in SARscape.

1.2.4 Import Data/SAR Spaceborne/Single Sensor/UMBRA SICD

Supported products: SLC Single Look Complex, Observation modes: Spotlight, Stripmap, Extended dwell, Scanning.

1.2.5 Import Data/SAR Spaceborne/Single Sensor/Sentinel-1

A new flag has been introduced to allows the user to remove the thermal noise during the import process.

1.2.6 /Import Data/Download/Capella Archive Download

This tool allows one to perform a query to download Capella data from the Capella Space website archive - (<https://www.capellaspace.com/>).

1.2.7 Basic/Intensity Processing/Geocoding/Projection Transformation

New developments introduced the possibility to generate ground range products starting from slant range, geo, GEC or georeferenced images. The ground range geometry can be used as common geometry for different products for classification purposes. Furthermore, the possibility to transform GEC and geo images in Slant-Range coordinates allows users to use these products to generate Stereo DEMs.

1.2.8 Interferometric Stacking/Post Processing Tools/Point Density Map

This tool creates a raster point density map based on an input point shape file. It is intended to be used to visualize the geometrical distribution of valid displacement measurements points generated by SBAS or PS processing.

1.2.9 Interferometric Stacking/Post Processing Tools/Skew Estimation

This tool is used to compute the angular distortion on the input velocities.

1.2.10 Interferometric Stacking/SBAS & E-SBAS/SBAS Tools/SBAS Variogram

Since Variogram tool is used to evaluate the performance of the atmosphere removal algorithms within the SBAS processing chain. This tool perform a statistical comparison before and after the application of a specific atmosphere filter.

1.2.11 Interferometric Stacking/Post Processing Tools/Time Series Classification/Clustering

This tool is intended to cluster the deformation time series generated by PS or SBAS processes. It works by grouping nearby time series according to their similarity based on a modified DB Scan algorithm.

1.2.12 Interferometric Stacking/ E-PS

The new Enhanced-PS technique identifies Distributed Scatterers and Permanent Scatterers pixels to improve the InSAR pixel coverage over rural areas by implementing adaptive filtering on the interferometric phase. The typical level of detail of the PS displacement time series is applied to DS pixels too.

1.2.13 Interferometric Stacking/ E-SBAS

The new E-SBAS technique identifies and process Permanent Scatterers pixels together with Distributed Scatterers ones. Providing a more comprehensive and valuable output. E-SBAS is capable of measuring Non-Linear displacement trend to both PS and DS pixels.

1.2.14 General Tools/Data Transformation/Conversion DEM to Slope and Aspect

Possibility to covert the input DEM in Aspect.

1.2.15 Cartographic System

SARscape 5.7.0 has adopted the cartographic system already used by ENVI.

1.2.16 Conventional naming

The terms "Master" and "Slave" are replaced by the terms "Reference" and "Secondary".

1.3 New Tasks

1. [BasicImageConversionToOrthographicProjection] Image Conversion to Orthographic Projection
2. [BasicImageConversionToGroundRange] Image Conversion to Ground Range
3. [BasicImageConversionToSlantRange] Image Conversion to Slant Range
4. [GradientCalculator] Skew Estimation
5. [ImportLuTan1] Import LuTan-1
6. [ImportUmbraSICD] Import UMBRA
7. [InSARConnectionGraphESBAS] ESBAS Connection Graph
8. [InSARConnectionGraphPS] PS Connection Graph
9. [InSARConnectionGraphTomo] Tomographic Connection Graph
10. [InSARSingleRasterDisplacementUtility] Single Raster Displacement Utility
11. [InSARStackESBASGeocode] ESBAS Geocoding
12. [InSARStackESBASInterferogramGeneration] ESBAS Interferogram Generation
13. [InSARStackESBASInversion] ESBAS Inversion
14. [InSARStackPSAdaptiveFiltering] PS Adaptive Filtering
15. [InSARStackSBASVariogram] SBAS Variogram
16. [stackingUtilityPointDensityMap] Process Point Density
17. [ToolsConversionDemToSlope] Conversion DEM to Slope and Aspect
18. [ToolCapellaGet] Capella archive download
19. [SARsInSARStackSBASGeocode] SBAS Geocoding

1.4 Improvements

1.4.1 Import Data/SAR Spaceborne/Single Sensor/Sentinel-1

Possibility to remove the thermal noise during the import process.

1.4.2 Import Data/SAR Spaceborne/Single Sensor/CSG

Automatic coregistration of the four polarizations (HH + VH + HV + VV) during the import process. This allow the user to perform polarimetric analysis. The original data has a native channel misalignment issue, therefore the different polarizations of the same acquisition are not aligned.

1.4.3 Import Data/Download/Sentinel Auxiliary Files Download

Possibility to download the orbital files for a specific time interval.

1.4.4 Basic/Intensity Processing/Geocoding/Layover and Shadow Mask Generation

Processing speed-up and improved precision.

1.4.5 Basic/Feature Extraction/Ship Features/Coastline Extraction

A new flag has been introduced to allow users to work without considering tides. This feature can be applied to estimate the coastline of inland water bodies, such as lakes or rivers.

1.4.6 Error Messages

Improvement on the error message management, the new approach will help users in better identifies the cause of the issue.

1.5 Third-Party Libraries

1.5.1 Import Data/SAR Spaceborne/SICD

SARscape is built against the six-library version 3.2.2, which currently supports SICD formats 0.3.1, 0.4.0, 0.4.1, 0.5.0, 1.0.0, 1.0.1, 1.1.0, 1.2.0, 1.2.1, 1.3.0 and SIDD formats 1.0.0, 2.0.0, 3.0.0.

2 Bug fixing

SARscape 5.7.0 includes the bug fixing provided in all the patch released for SARscape 5.6.2.1 and the last bug fixing not included in former patches.

[20230614] Bug Fix: Asnaro-2 FastTime.

[20230614] Bug Fix: Remove stripes appearing in interferogram after the height correlated atmosphere removal (SBAS).

[20230614] Bug Fix: Sample selection and mosaic.

[20230614] Bug Fix: SICD Calibration with RCSSFPoly.

[20230614] Bug Fix: shape decomposition bug, the software crash when some entries contain damaged points. Skip them sending a warning, without ending the process.

[20230614] Bug Fix: Set correct orb name in case the input file names are equal (different path). This avoid wrong multiple looks during synthetic phase generation.

[20230614] Bug Fix: shape decomposition bug, the software crash when some entries contain damaged points. Skip them sending a warning, without ending the process.

[20230614] Bug Fix: Geoid EGM2008 management.

[20230207] Bug Fix: The Refinement and reflattening step, performed during the SBAS geocoding step, is performed on the displacement time series, and not the displacement model layers, which are estimated again from flattened displacements.

[20230207] Bug fix: PS Connection Graph. Wrong error message reporting different polarization among the images.

[20230207] Bug fix: PS Geocoding. Software failure when the geocoding is run after incremental step.

[20230207] Bug fix: Geocoding. Image cropped for geocoding near longitude coordinate 0.

[20230113] Bug fix: Sentinel-1 Multi Download unzip.

[20230113] Bug fix: Sentinel-1 SLC Sample Selection

[20230113] Bug fix: Stripes in unwrapped phase interferograms during SBAS first inversion, when Delaunay MCF method was selected.

[20230113] Bug fix: Layover and shadow mask software crash without error message.

[20230113] Bug fix: Use of GCP in layover and shadow mask tool.

[20230113] Bug fix: SBAS Interferometric Process with cluster mode active. The software stops during interferogram generation in incremental mode.

[20230113] Bug fix: GSI GPS data import with many dates.

[20230113] Bug fix: Synsperspective polarization extraction.

[20230113] Bug fix: Multilooking of big images.

[20221124] Bug fix: PS Sentinel-1 with several bursts.

[20221124] Bug fix: Cluster preferences.

3 End-of-Life (EOL) announcement

Starting from the next SARscape sub-release, the following tools will reach their EOL and will be removed:

- The tool Gaussian Gamma MAP will be dismissed (/Gamma and Gaussian Filtering/Single Look Complex/Gaussian Gamma). The SLC Gaussian DE MAP filter offers the same capabilities as the Gaussian Gamma tool and can be used as an alternative to it.
- The tools Sample Selection SAR Geometry data and Sample Selection Geographic Data will be merged in a single tool.
- The workflow panels will be re-arranged.