



# ENVI<sup>®</sup> SARscape<sup>®</sup> Release Notes

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## Version 5.5.3

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# What's New in SARscape® 5.5.3

## March 2020

The newest release of SARscape – version 5.5.3 – introduces some algorithmic improvements and new features.

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## 1 What's new

### 1.1 New features

#### 1.1.1 Import Data – SAR Spaceborne – Single Sensor- SAOCOM-1

SAOCOM-1 products, are imported into the SARscape Data Format for further processing in a preliminary version. Only Single Look Complex data and Detected Image (ground range projected) are supported.

#### 1.1.2 Import Data – ASF Sentinel Download

This tool allows one to perform a query and download Sentinel data from the Alaska SAR Facility - ASF - (<https://search.asf.alaska.edu>). An account with login credentials is required.

#### 1.1.3 Basic – Intensity Processing – Filtering – Adaptive Non Local

To reduce the speckle noise, a non-local filter, specifically designed for SAR non-additive noise, is now available. This tool is based on the paper reported in the References paragraph with the addition of a custom locally-adaptive similarity probability kernel. This kernel is used to overcome local distortions caused by strong backscattering variations, typical of the original filter design.

Non-local-based filtering is an intrinsically, computationally demanding feature, due to its many comparisons between different image areas. As a consequence, this tool put the underlying hardware components under stress and requires a significant amount of time. For this reason, our implementation is entirely written in OpenCL to take advantage of the massive level of parallelization offered by modern graphical processing units. Hence, we warmly recommended to use this filter only in combination with a powerful GPU selected as the current OpenCL platform/device under the SARscape Common Preferences. It is always possible to select and rely to a CPU-only OpenCL platform/device, but in such a case performance will roughly be one order of magnitude lower than using a modern GPU.

#### 1.1.4 Interferometry Module – Clustered Processes – Stereo Cluster

This tool aims to include the Stereo Matching Process and the Shift to Height Conversion and Geocoding in single step exploiting the capabilities of SARscape cluster (if enabled and licensed). As a function of cluster nodes, the full area is splitted in more subareas and each subarea is processed. A mosaiced final result is obtained.

#### 1.1.5 Interferometry Stacking – Stacking Tools – Meta Combination

Meta Combination tool allows users to compute the displacement decomposition of time series or compute the merging of time series in raster format. The Displacement Decomposition option calculates the vertical, east-west and optionally north-south components for both the displacement time series and average velocity. For 2D decomposition, more than one stacking displacement

series are needed over the same area of interest. For 3D decomposition (2D+1D, 1D+2D) more than two stacking displacement series are needed over the same area of interest. The Merging option calculates both the merged time series and the merged average velocity. At least two stacking displacement series are needed over the same area of interest with at least the same LOS angle.

### 1.1.6 Interferometry Stacking – Stacking Tools – Shape Combination

Shape Combination tool allows users to compute the displacement decomposition of time series or compute the merging of time series in shapefile format

### 1.1.7 General Tools – Data and Quality Analysis – RFI Filter

This tool removes RFI interferences from SLC data in the frequency domain improving the image quality without degrading the image resolution and revealing terrain features that were previously covered by the RFI. Moreover, intermediate files can help to understand the nature of the interference in the area.

## 1.2 Improvements

### 1.2.1 Basic – Intensity Processing – Filtering – Filtering Single Image ANLD

This tool allows reducing noise in an image by applying a not-SAR-specific filter. It emphasizes edge and lines, or other significant details, and remove non-significant parts of the image leading to a noiseless interpretation of the image.

### 1.2.2 Basic – Intensity Processing – Import Data – AIS

For CSV format data, the column of the csv file in which the parameter is reported can be specified in the Principal Parameters.

### 1.2.3 General Tools – Data and Quality Analysis – Data Statistics

A new statistical parameters is extracted: Equivalent Number of Looks entire (Partitioned Least-Squares Fit estimation method). It is based on methods described in Lee, J. S., and K. Hoppel (1999) and Ramponi et al. 1999.

### 1.2.4 General Tools – DEM Fusion – Wavelet Combination DEM

This tool substitutes the low pass components on the high frequency DEM with the low pass component on the low frequency DEM, starting from the set value. This parameter depends on the Low Resolution DEM.

## 1.2.5 Interferometry – Displacement Modeling

Main improvements of the modeling module are: new graphic tools to create ready-to-publish images 2D and 3D, in several formats; totally flexible handling of UTM and Lat/Lon coordinate systems; a new elastic source to model nuclear explosions; a new interface to simplify the raster data sampling; additional options in all the processing sections with the new “full-resolution” algorithm in linear modelling; an optimized interface with pull-down menus.

## 2 Bug fixing

SARscape 5.5.3 includes the bug fixing provided in all the patch released for SARscape 5.5.2 and the last bug fixing not included in former patches.

[20200320] Fixed bug import ICEYE without acquisition time annotation

[20200320] Back compatibility GCP tool with the old ENVI versions

[20200320] Fixed bugs in PS velocity offset estimation.

[20200320] Fixed bug GCP tool

[20200320] Fixed bug PS

[20200320] ENVI 5.5.3 compatibility sarmap\_envi\_current().

[20200320] Fixed bugs in PS geocoding step.

[20200320] Fixed bugs in PS merging step after adding new acquisition.

[20200320] Fixed bug in Layover Shadow mask for left looking images.

[20200116] SBAS error during geocoding.

[20200116] ALOS World DEM 3D 30m linux

[20200116] New task SARscape\_setting\_output\_folder.

[20200116] Fixed bug in the import Generic SAR data for Palsar-1 in Jaxa format.

[20200116] Fixed bug limit to 100 images for geocode meta and series.

[20200116] OpenAs SARscape additions: Novasar, ICEYE, Gaofen-3 and SICD to import menu.

[20200116] Fixed bug in the import Palsar-1 in ESA format.

[20191127] Fixed bug in the import ERS IMM.

[20191127] Fixed bug in the Modeler task.

[20191127] Fixed bug in the SBAS geocoding step with no displacement model option.



[20191127] Fixed bug in the PS geocode cluster version.

[20191127] Fixed bug in the sample selection (no results).

[20191127] New supported product for ASNARO-2 ScanSAR 1.1.

[20191127] Fixed bug in the De-Grandi filtering triggered when using a large amount of input data.

### **3 End-of-Life (EOL) announcement**

Multi-temporal ANLD reached EOL and is no longer available.