

ONE PAGER SERIES

# SAR Data Pre-Processing Steps

A cheat sheet outlining the workflow for pre-processing L1 Synthetic Aperture Radar data. For more information, check out the SAR Handbook: Comprehensive Methodologies for Forest Monitoring and Biomass Estimation and associated training materials at [SERVIRglobal.net](https://SERVIRglobal.net)



## Apply Orbit File

Defines the relationship between ground and image coordinates, improves accuracy of later orbit-based calibration steps.



## Radiometric Calibration

Converts the image pixel values from digital number (DN) to a standard geophysical measurement unit of radar backscatter.



## De-Bursting

SAR scenes can be made up of multiple swaths or sections. This step combines all swaths into a single image.



## Multilooking

Uses spatial averaging to reduce image speckle noise and converts to ground range, producing an image with a standard pixel size. Reduces image resolution (*optional*).



## Speckle Filtering

Removes noise, or speckle, in an image. Many types of speckle filters can be applied, and different applications have specific filters that may work best. Unlike multilooking, this step does not reduce spatial resolution (*optional*).



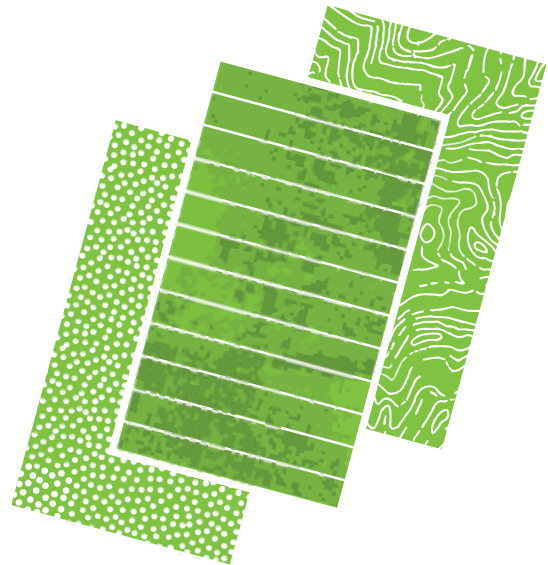
## Terrain Correction: Radiometric Terrain Flattening (RTF) & Geocoding

RTF: Uses a DEM to remove geometry-dependent radiometric distortions; normalizes measured backscatter with respect to terrain slope.  
Geocoding: Uses a DEM to remove geometric distortions such as foreshortening, layover, and shadow; connects the image to a geographic coordinate system.



## Convert to dB

Linearly-scaled data is converted into decibels (dB) (*optional*).



SOURCE: Meyer, Franz. "Spaceborne Synthetic Aperture Radar – Principles, Data Access, and Basic Processing Techniques." SAR Handbook: Comprehensive Methodologies for Forest Monitoring and Biomass Estimation. Eds. Flores, A., Herndon, K., Thapa, R., Cherrington, E. NASA. DOI: 10.25966/ez4f-mg98

