

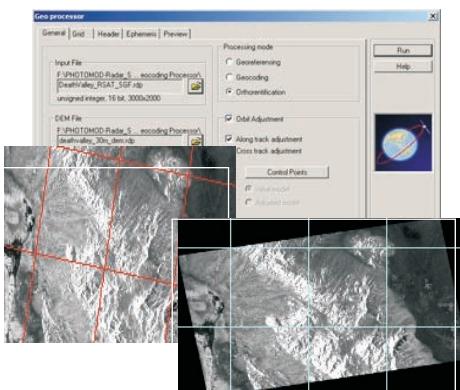


Spaceborne SAR data processing

# PHOTOMOD Radar

The PHOTOMOD Radar software is intended for full-scale processing of Earth remote sensing data acquired by spaceborne radars with synthesized antenna aperture (SAR) such as ERS-1/2, Radarsat, SIR-C/X, ENVISAT ASAR, TerraSAR-X, ALOS, COSMO-SkyMed and generation of so called 'secondary information products' from SAR images, such as digital elevation models.

The fact that SAR is the active sensor makes possible reception of required measurements independently of time, day and weather conditions..



## Geocoding Processor

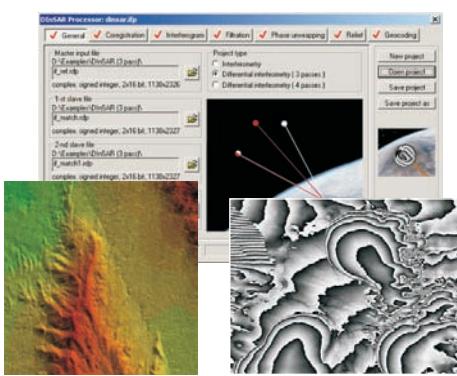
Geocoding Processor is intended for precision geometric correction of SAR images use by an accurate SAR sensor model based on the satellite position, survey features, and image formation parameters. Sophisticated algorithms are used for detailed positioning of each pixel on output image. The standard processing procedures are supported: georeferencing, geocoding, and orthorectification. The inputs of Geocoding Processor are the spaceborne radar imagery presented in single look complex CEOS format for the georeferencing procedure and georeferenced CEOS format for the geocoding/orthorectification once.



## Stereo Processor

Stereo Processor is an integrated software package specially intended for generation of the ground relief digital elevation models (DEM) via processing of the pairs of images acquired by spaceborne SAR's.

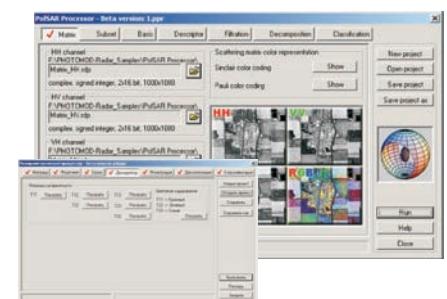
Stereo processor provides for users an extraction of terrain height information from stereo pairs of SAR satellite imagery. It allows to generate an accurate digital elevation models (DEMs) of imaged ground surface.



## InSAR Processor

InSAR/DInSAR processor has been developed as tool for DEM generation and surface shift estimation using of phase information extracted from complex spaceborne SAR data.

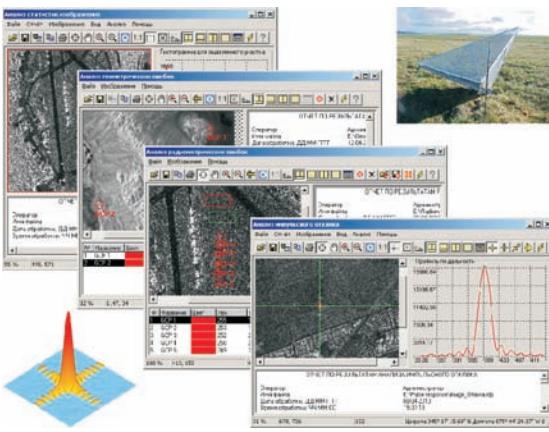
The output DEM or surface shift map are referenced to WGS84 ellipsoid and allocated in geographic projection.



## Polarimetric Processor

Polarimetric processor realizes the technique of joint processing of images acquired with different signal polarization. In common case it allows to classify the resolution cells on images upon their physical properties.

Input data for polarimetric processor are the radar images presented in complex format, path coordinate system, in slant range projection. Processor has deal both with full polarimetric matrix (four combination of polarizations for transmitted and received signals) on input and with incomplete polarimetric matrix (two combination).



## Software Tool of Coherent Change Detection

Software tool of coherent change detection intended for acquiring of data on ground surface backscattering properties variation on time interval between two acquisition made under interferometric conditions.

Realized in software approach to change detection is based on analysis of differential phase or so called coherency information derived by processing of interferometric pair of images. It's well known that the phase properties of backscattered signal depend of ground surface roughness on scale of radar wavelength that cover the range from 3 up to 30 cm. This means that the millimeter's scale changes could be extracted via



## Software Tool of Coherent Co-Registration of SAR Images

The software tool of coherent co-registration of SAR images has main task to provide the possibility for user to generate the set of images matched mutually with subpixel accuracy. The matching is performed on base of pixel's phase values analysis. It means that the input images for processing should have complex format and be acquired under conditions of interferometric imagery.

## Oil Slicks Detection Processor

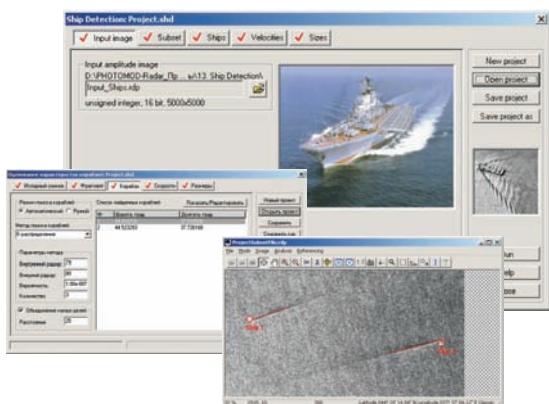
Oil slicks detection processor is intended for oil slicks detection against a background of homogeneous sea surface.

## Ship Detection Processor

Ship detection processor is designated for processing of spaceborne radar images acquired over sea and ocean surface in part of ships finding and evaluation of their most valuable parameters, the like of speed of ships, their sizes, and cartographical coordinates.

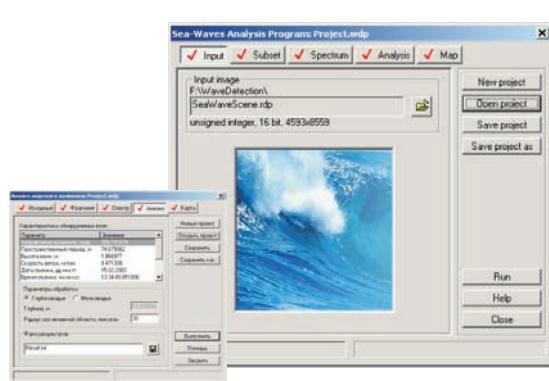
## Sea Waves Analysis Software Tool

Sea waves analysis software tool is intend for automatic generation of estimates of spatial period, direction of propagation and height of large energy carrying waves over radar images of sea surface.



## Quality Estimation Software Tools

Software tools of image quality estimation allow to analysing the number of radar image properties under some of standard parameters inherent specifically to this type of sensor.



## Image Enhancement Tools

The radar data processing software package includes the following tools intended for image enhancement: speckle-noise filters and edge detection (detection of local brightness variables) ones.

## Feature Extraction Tools

Software tools intended for extraction specific information from the radar images. It allows user to detect difference texture characteristics of scene and to form number of surface classes over one or several input images under selected criteria.