ScanEx Image Processor Software. In-Depth ERS Data Processing Technology. The Art of Thematic Interpretation: Training Course Program

Day 1

Theoretical part:
- Satellite imagery and its features, the current database of satellite images;
- Parameters of imaging orbits;
- Different classes and types of imaging equipment;
- Basic principles of imagery generation by modern imaging systems

Practical part:
- General description of ScanEx Image Processor software (purpose, specific features, main formats supported, software interface);
- Getting started (downloading data in the software, changing projection and project file resolution, working windows and navigation tools, operations with imagery, operations with histograms, saving processing results in a file);
- Operations with vector layers (downloading vector layers in the software, creating and editing vector objects, selecting a display option for object captions, creating a new vector layer, adding and viewing the attribute data of vector layers);
- Creation of a raster data library and importing data therefrom.

Day 2

Theoretical part:
- Basic approaches to correcting the geometric distortions of different imagery types, with account of imaging equipment specifics and local relief;
- Digital elevation models (DEMs);
- Determination of reflectance and atmospheric correction methods offered by SIP;
- Enhancements, spectral transformations;
- Topographic correction;
- Methods of creating digital elevation models (DEMs) and digital terrain models (DTMs);
- Index-based imagery.

Practical part:
- Geometrical correction: georeferencing based on a strict sensor model;
- Batch download of publicly available digital elevation models DEMs (GTOPO-30, SRTM-30 etc.);
- Orthotransformation;
- RPC-based geometrical correction;
- Automatic co-registration of imagery.

Day 3

Theoretical part:
- Application areas and possible use of satellite imagery;
- Preliminary image analysis required for data decryption;
- Key methods and approaches to satellite imagery decryption: visually interactive and automatic decryption;
- Algorithms of automated satellite imagery classification: per-pixel and object-oriented classification;
- Additional methods and tools of decryption;
- General technology chain of satellite imagery thematic processing.

Practical part:
- Satellite image classification by the method of spectral non-learning per-pixel classification;
- Creation of learning classification standards;
- Satellite image classification based on feedforward neural networks.

Day 4
Practical part:
- Satellite image classification by the method of pre-trained self-organizing neural networks;
- Managing the display and representation of the neural network, preliminary assessment of a created neural network and classification quality;
- Creating a thematic legend and the system of hierarchical classes;
- Vectorization and rasterization of classification results, saving classification results;
- Segmentation of a multi-channel satellite image;
- Post-processing of satellite imagery classification results;
- Binary classification;
- Detection of variations in multi-temporal data (Channel Change).

Day 5
Practical part:
- Bundle adjustment;
- Creation of mosaic coverage with automatic tonal balancing and automatic cutline generation
- Improvement of spatial resolution (Image Fusion operation);
- Synthesis of green and blue channels (for data without any blue elements);
- Haze compensation in multispectral imagery;
- Determination of reflectance and atmospheric correction;
- Arithmetic operations with raster layers, creation of macros;
- Operations with index-based imagery (creation, visualization).