**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).