ASRC
Advanced Studies and Research Center

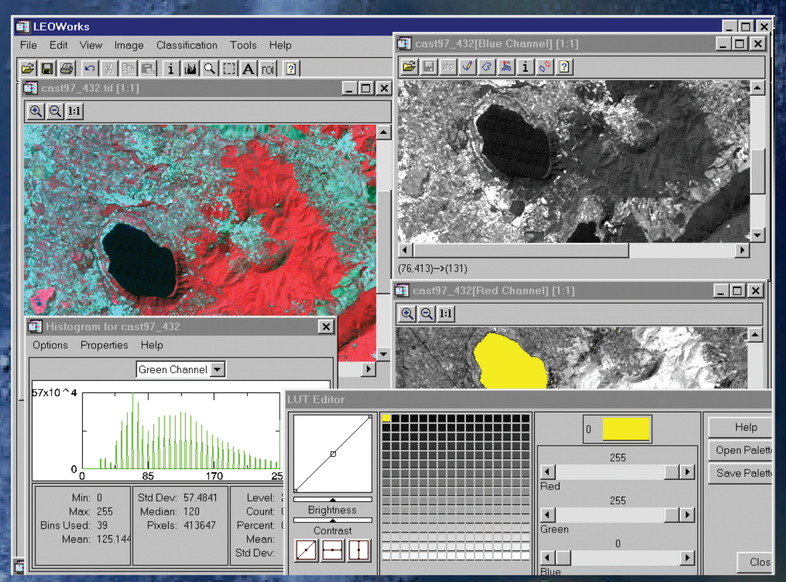
esa

# Educational tools for learning Earth Observation

## LEOWorks
### Toolbox for Remote Sensing and GIS

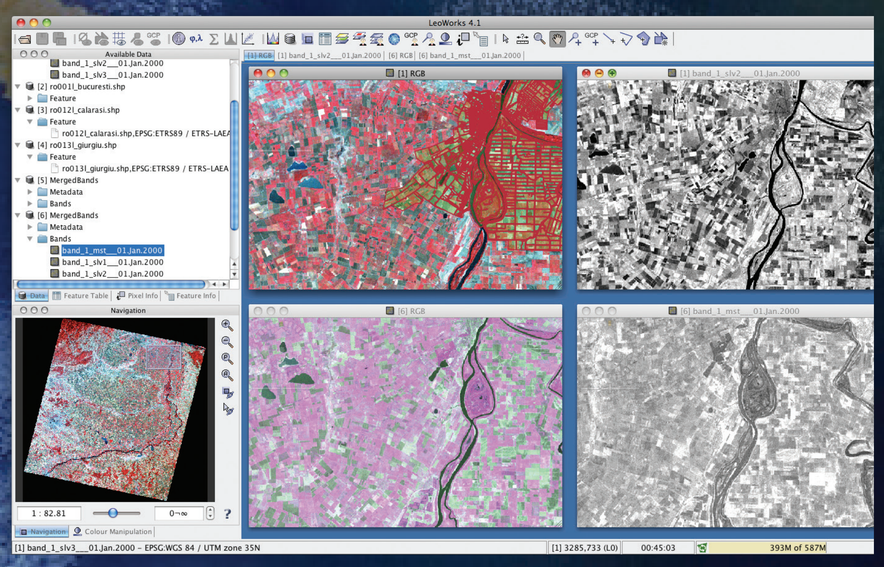
LEOWorks is the ESA Eduspace software toolbox for demonstrating and teaching the use of Earth Observation data processing techniques.

LEOWorks 3.0 Features:
- Display images in grayscale, RGB;
- Edit the colour palette used to display an image;
- Image enhancement (contrast, filter);
- Perform measurement on images;
- Unsupervised and supervised image classification;
- Create, edit and query vector data;
- Temporal series animation.




◀ *LEOWorks 3.0 Toolbox*

LEOWorks is now being re-engineered. LEOWorks 4.0 is entirely written in Java making use of the most advanced software technologies and will be more flexible and easier to use for both students and teachers in schools and universities.
LEOWorks 4.0 Features:
- Modular design allowing easy development of new functionalities and tools as plug-ins/modules, and linking to external libraries;
- Read common satellite data formats (ENVISAT, SPOT, Landsat, etc.) as well as generic digital image formats (geotiff, jpg, bmp, etc.);
- Basic GIS and new optical and SAR image processing tools added on top of the existing components developed in ESA's BEAM and NEST projects;
- Application-specific image processing algorithms for detecting e.g. urban areas, oil spills, ships.




▶ *Generate viewers combining layers derived from both raster and GIS vector data*

LEOWorks 4.0 is developed and will be released under a GPL license (independent platform and no licence fees)

## INTERACTIVE METEOSAT
### Software for meteorological applications

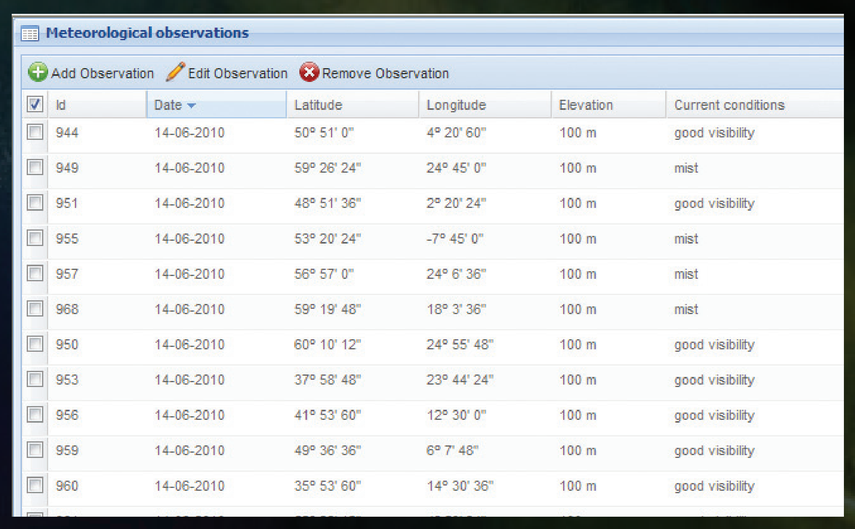
IM is an interactive application for the teaching of satellite meteorology. It forms a part of the IM case study on the ESA Eduspace website.

Using appropriate symbols, the observations can be displayed, queried and analyzed on daily Meteosat weather satellite images and synoptic weather maps, thereby enabling a more detailed interpretation of the satellite images.

Functionalities:
- Zooming;
- Panning;
- Introducing quantitative geotagged data (current conditions, wind direction, wind speed, cloud cover, elevation and temperature);
- Uploading photographs and text describing the weather.


◀ *A simple and intuitive web interface*

◀ *Display imagery from Meteosat Weather Satellite*




| Id | Date | Latitude | Longitude | Elevation | Current conditions |
|---|---|---|---|---|---|
| 944 | 14-06-2010 | 50° 51' 0" | 4° 20' 60" | 100 m | good visibility |
| 949 | 14-06-2010 | 59° 26' 24" | 24° 45' 0" | 100 m | mist |
| 951 | 14-06-2010 | 48° 51' 36" | 2° 20' 24" | 100 m | good visibility |
| 955 | 14-06-2010 | 53° 20' 24" | -7° 45' 0" | 100 m | mist |
| 957 | 14-06-2010 | 56° 57' 0" | 24° 6' 36" | 100 m | mist |
| 968 | 14-06-2010 | 59° 19' 48" | 18° 3' 36" | 100 m | mist |
| 950 | 14-06-2010 | 60° 10' 12" | 24° 55' 48" | 100 m | good visibility |
| 953 | 14-06-2010 | 37° 58' 48" | 23° 44' 24" | 100 m | good visibility |
| 956 | 14-06-2010 | 41° 53' 60" | 12° 30' 0" | 100 m | good visibility |
| 959 | 14-06-2010 | 49° 36' 36" | 6° 7' 48" | 100 m | good visibility |
| 960 | 14-06-2010 | 35° 53' 60" | 14° 30' 36" | 100 m | good visibility |

◀ *Display observations uploaded by students*

It is an interactive tool, user friendly for students and teachers across Europe.

The software is built entirely with standard compliant free and open source software applications like OpenLayers, GeoServer and GDAL.

**LEOWorks 4.0 and IM are developed by Advanced Studies and Research Centre (ASRC), Romania.**
**For more information, please contact ASRC: http://www.asrc.ro/**
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