PETROSEIKON
Geophysical exploration

EMIGMA COMPLETE –   *February 2014*
Magnetics, FEM, TEM, Gravity, IP, Resistivity,CSAMT
Including Airborne FEM and TEM capabilities
(does not include MT/CSEM/MTEM/ZTEM/AFMAG or Marine EM
 but these are available as add-ons)

Unlimited Survey Size!

GUI Interface - Intuitive User Interfaces for Windows 2000/XP/Vista/W7

Data Imports
- **Large Loop TEM Imports** (Zonge, UTEM, GEONICS ,CRONE, Phoenix Fixed loop, moving loop, ground, borehole configurations
- Small loop systems such as FASTEM , TerraTEM, EM47, Phoenix, WTEM   .
- **FEM Imports** (Ground and Airborne)
- **AirborneTEM** Geotem/Megatem/Tempest/HeliTEM,VTEM,AeroTem,SkyTEM
- **AMIRA TEM** (Geonics, Crone, Sirotem, DigiAtlantis)
- **DC Magnetic, DC Magnetic Gradients** (XYZ format, Scintrex Smartmag and Envi-Mag, NavMag , airborne systems – helicopter or fixed wing, .gdb formats)
- **Magnetic Gradient and vector imports**
- **Time Domain IP**
  (ELREC 6 format, IPR10/11/12, ASCII text format, Zonge .avg)
- **Frequency Domain IP (**ASCII text format, Zonge .avg**)**
- **Resistivity Data** (Generic ASCII text file, SysCal, Zonge .avg)
- **Gravity Data** (XYZ format, .gdb) including full tensor gradients
- **CSAMT –** ASCII, Zonge .avg and Phoenix imports and .qct format

Data Management
- Database backbone
- Large data set handling: three levels of data organization inside a database
- Merging, export, import of data sets and their customization for further
- Data statistics

Data Processing and Correction (a partial list)
- 1D and 2D digital and spatial filters, with sizes specifiable by the user
- Simple and weighted averaging decimation
- FFT tools for gravity and magnetic data applicable to both measured and simulated data
- Graphical data extraction, profile editing and modification

- Data Spreadsheet tool combining dynamic spreadsheets and line plotter for data cleaning, missing data interpolation and simultaneous plotting of different data channels for fast cross-analyses
- Profile Modification tool – survey editing with map underlays
- Magnetic base station correction
- Latitude/Longitude projections including polar projections
- And more

3D Modeling
- Easy model building: large data sets, flexible profile generation and manipulation, multiple system geometries, large loop modeling, etc.
- Unlimited plate, prism and polyhedra anomalies suitable for
   EM, Gravity, Magnetics, IP, Resistivity, CSAMT data
- Multiple target shapes: pipes (hollow cylinders with or without lids), ellipsoids, shells, bullets, landmines, drums, spheres, prisms, plates, general polyhedra...
- Multiple scattering modeling: Simple Superposition, Far- and Near-Field Interaction, Automated Mode
- Synthetic Topography-Poly Generator for modeling complex geological anomalies and topography
- Modeling conductors with volume ILN prisms - Volumetric Induction Modeling
- Model suite generation for rapid building of layered earth and plate model suites with varying resistivity, thickness, strike, strike length, dip, dip extent, plunge and conductance
- 3D forward simulation in batch mode: multiple sources, any number of profiles or boreholes, any number of data components
- Import/Export of geological models from CAD applications
- Model building tool in 3D space
- Sphere algorithm, new inductive plate algorithm

Data Inversion
- Stacked Occam and Marquardt constrained 1D inversions
   for EM, Resistivity, CSAMT with true 3D source
- 3D inversion for Magnetics and Gravity for
   ground or airborne including gradients
   joint inversion of ground and airborne data
   utilization of core results for constraint
- Section cutting of 3D models in the 3D Visualizer
- 2D representation of geoelectric sections – PEXShow tool
- 3D Resistivity inversion
- Magnetization vector inversions
- 3D CSAMT now available

3D Extended Euler Deconvolution
- Statistical and Rodin spatial post-processing
- 2D and 3D visualization of solutions
- Magnetization inversion for angle and position

CDI MAP
- Apparent Resistivity Tool - a half-space mapping technique for generating apparent resistivities as a function of frequency or time window
- Sengpiel Depth-Sections - a resistivity pseudo-section technique for generating resistivities as a function of pseudo-depths
- Decay constants for TEM (quasi-animation) on grids, on lines or at each point
- CDI for ground or airborne TEM

2D and 3D Visualization
- Data visualization in 3D space, as profiles, vectors, true 3D surfaces or contoured surface along with the 3D structure display
- Ability to view up to three data channels
- 3D modeling tools: easy object manipulation and adjustment, single-click conversion of prisms to polyhedra, etc.
- 2D and 3D visualization of Euler solutions and magnetic inversion results
- 3D visualization of survey inversions

Plotting
- Comprehensive XY Plotter for plotting data, decays and positions
- Multi-channel and multi-profile plotting
- Flipping between apparent resistivity and conductivity
- Toggling between channels, profiles and models
- Plotting to scale
- Multiple plots per page
- Residual plotting
- Saving plotting defaults for rapid plotting of model suites
- FOM algorithm for data quality control
- Decay rate calculation

Gridding
- Five gridding algorithms: Natural Neighbor, Delauney Triangulation, Shepard & True-to-Data, Minimum Curvature and Thin-Plate-Splines
- Quick setting of your grid geometry and input data to be used for interpolation – ProfileViewer
- Residual grids, grid exporting

Grid Presentation and Analyses
- Multi-component grids - switching between channels and components without a necessity to grid anew each time
- Rectangular grid cells
- Profile, data and contour overlays
- Equal Weight and Equal Range display
- Single-click conversion to Apparent Resistivity and Conductivity
- Analytic Signal displays
- Euler solution overlays
- Decay rate/Amplitude mapping and export
- Superposition on raster maps and annotation – export/import Geotiffs
- MultiGrid tool - viewing and comparing up to 4 grids at a time

Contouring and Mapping
- Another view of gridded data
    – OpenGL interpolation or advanced local contouring
- 3D surfaces, 3D volumes
- Multi-component contours – switching between components and channels
- Contour lines and their customization
- Data display as 3D surfaces
- Range of pseudo-depth and pseudo-section displays
- 3D volume interpolation of inversion results – section cutting
- Use of UTM calibrated maps , production of UTM calibrated maps

Data Export
- Model Export to postscript files or raster formats as well as several CAD formats
- Inversion Export to XYZ ASCII and .qct format (containing station, position, depth and apparent resistivity) to allow for the geoelectric sections to be utilized in other plotting or printing applications such as Geosoft or Surfer
- Model data and processed data export to XYZ or Geosoft format (*.gbn)
- Export to EMIGMA database or PetRos PEV file format permitting you to share your results with colleagues
- *.QCT format
- 2D Geotiff , AutoCAD and Google .kml exports

QCTool

EMIGMA Premium Complete includes QCTool which provides a range of initial processing tools including data correction and quality control. Also included are a full range of very accurate gravity corrections plus diurnal, igrf and drift corrections for magnetic data.