The PetRos EiKon News
News from *PetRos EiKon* **Incorporated**
FEBRUARY, 1996

Sneak Preview into EMIGMA Version 5

Version Five of *PetRos EiKon*'s **EMIGMA** electromagnetic simulation platform offers a powerful new numerical engine with 3D visualization and an all graphical user interface platform.

HEADLINES THIS MONTH

- Redesign of EMIGMA
- New Additions in Version 5

The *PetRos EiKon* crew have been busy lately keeping **EMIGMA** leading edge technology. We are excited to announce that Version 5 is entering the Alpha stage of development. Evaluation of the new software design and developments of the prototypes of the new products occurred in the fall of 1995. Re-engineering the existing software for the new design began in December. Currently, we are working to bring our new platform design to a deliverable product. We have begun internal testing and expect to distribute the product for *Beta* testing in late spring.

EMIGMA Version 5 - Redesign of Software

Functionality and Ease of Software Development: **EMIGMA** V5 has been redesigned for three main reasons. First, for using the advanced features of Windows NT and Windows 95 operating systems. Second, for more effective software design to allow fluid sharing of data between different tools and for the ease in adding new tools. And finally and most importantly for easier and more efficient user functionality, allowing more rapid and effective modelling and interpretation. Some specific aspects we mention here now are : a) incorporation of inversion applications, b) effective software maintenance of the integrated products and c) ease of use of visualization tools.

Improved Memory Design for Software: Simulation and inversion applications require significant amounts of memory but do not require all this memory simultaneously. Traditional static allocation of memory, is not only inefficient but contrary to 90's software design. Improved memory design reallocates memory to reduce memory swapping to the disk and thus enhances computation speeds and improves stability of the software. The key here is the splitting of the large memory applications into multiple .DLL modules, the dynamic allocation of memory as required and the release of that memory when not required. This concept is available in many applications including many visualization, graphing and databasing tools now in use. However, such design concepts have not been

applied to traditionally designed forward modelling and inversion number crunching software. Extending this design to the root of our software allows us to fully integrate the simulation and inversion tools with graphing, databasing and visualization.

Multi-threaded Environments: Taking advantage of Microsoft's new Multi-threaded environments for both Windows NT and Windows 95 increases the stability and speed of execution of the software. In addition it makes effective use of the new generation of multi processor PC's.

Reliable dual pentium processors are a powerful and rapid tool for development and modelling. Dual pentium boards are now available at a fraction of the price of UNIX work stations of comparable processing speeds and they will continue to come down in price while they increase in capability. By Fall 96, a reasonably priced pentium 130-160 Hz CPU with rapid SCSI hard drive will probably sell for less than $10 000 Canadian from your local distributor. In late summer 1995, *PetRos EiKon* acquired a dual 100 MHZ machine, all SCSI with 3D graphics board. With the release of Microsoft's new integrated Visual C $^{++}$ and Fortran 90 development tools, this has completely revolutionized the hardware and software tools available to us for the PC. With the release of the multithreaded Windows '95 operating system, a cheap, reliable environment was made available to our clients for our executables.

Other new tools allow the effective integration of 3D visualization, data display, simulation, inversion and databasing; but all this requires proper software design and engineering. We wish to take advantage of Microsoft's new multi-threaded environments and compilers in both Windows NT and Windows 95 to increase stability and speed of execution of the software and to use effectively the multi processor computers. However: through our prototype development stage this last fall, we realized this could **not** be done independently of the development of our simulation and inversion software. This was contrary to our original plans. These issues also had not been incorporated in the development design of other companies involved in such product development.

To take advantage of all this technology and to keep our software leading edge, we have added C^{++} and visualization software developers to our team and have developed and modified all our software with an integrated software design. Over the last eight months, our developers have been reworking the hereditary code to function inside this new integrated environment. We are now beginning to recoup the time taken for this redevelopment with more rapid development times for our new simulation and inversion products.

Features of EMIGMA V5

EMIGMA Version 5 has the same comprehensive electromagnetic forward modelling capabilities as Versions 3 and 4 but with some powerful additions. It includes the capability to utilize both *LNPRISM* and *VHPLATE* algorithms as well as EMSPHERE and EMMT modelling capabilities. **FSEMTRS**, our frequency to time domain transform is integrated with the forward modelling software with the added advantage of no longer having to run the frequency domain and transform software separately. The integration of these products will become transparent to the user. **FSEMTRS** also includes our spectral mode which allows broad band frequency domain data to be generated for the time domain transform with approximately seven fold less computation than would be required from the older time domain option.

New Additions to the:

Integrated EMIGMA Environment:

- **GUI (Graphical User Interface) -** For survey design, profiles, boreholes and waveforms. We have replaced the prompt based interface with an integrated Windows environment which provides the user with a graphical user interface that allows you to select and edit parameters quickly using mouse controls.

- ***EMIGMA PLOTTER*** - integrated XY plotter for data and simulations. Allows easy and quick comparison of actual data with simulated data. Designed for viewing your profile data.

- **3D Graphical building of Simulation Models** allows you to create (visually build), display and manipulate your inversion results with respect to geology, survey design, profiles, boreholes and borehole logs. The attributes of your prisms, plates, layers and survey can easily be changed within the program.

- **3D Resistivity/IP Inversion Software:** Our first 3D inversion application to come to product.

- **Data Importers** - Imports data from your contractor directly into **EMIGMA** without having to specify the system configuration. This will allow building of the simulation models directly from the survey files because data is automatically converted to Geosoft compatible file formats. In time these files will be replaced by access to the database of your choice.

Cost of EMIGMA Version 5

The cost of **EMIGMA** V5 will be dependent upon which modules you wish to order. If you already have a licence for an earlier version of **EMIGMA** and you are still under a maintenance contract, you can receive the upgrades to **EMIGMA V5** for those products for which you are now licenced at no additional charge. The **EMIGMA V5** environment now becomes our standard.

Pre-Offering: Free upgrades to Version 5 with the purchase of Version 3/4 prior to June 1, 1996. To take advantage of this offer contact Danielle Parker.☎

✎ **Reminder - Maintenance Contracts** ✎

We are approaching the time when some of your initial contracts are expiring. If you want to receive upgrades of the software including **EMIGMA V5** as well as technical support, it is important to keep up your maintenance contract.

What to Look for in the Future:

- ➪ 3D gravity and magnetic modelling
- ➪ A variety of inversion tools
- ➪ Ability to import your CAD drawings
- ➪ Ability to save your simulations and inversions to your internal database(s)
- ➪ Look for our new homepage on the internet at Web site:

http\\ourworld.compuserve.com\homepages\PetRosEiKon

For the Present:

- We now have available WINDOWS '95 and WINDOWS NT executables for **EMIGMA** *V3.12* and **EMIGMA** *V4.12* with either or both of *VHPLATE* and *LNPRISM* options and **FSEMTRS** *V2.*
- We have recently released several new software products for Magnetotellurics and CSAMT.
- We also offer an ***Interpreting Magnetotellurics*** and ***CSAMT*** course, if your company is new to these fields or does not have such specialists.

☎ Please contact Danielle Parker if you are interested.

Breaking into the Environmental Field

We are branching out into the field of environmental monitoring. We are working on adapting our software to be used in detecting the movement of pollutants in ground water. Applications are numerous. One application will be the use of our EM modelling software to track the movement of leachate from tailing ponds. This method will also be useful to monitor leachate from land fill deposits. Another application will be the location of ground water sources from air borne EM surveys, even when there is conductive cover. This method will be especially useful in areas where fresh water is scarce and ground water is the only source of potable water. We are hoping to provide an inexpensive and effective method for tracking the movement of fluids in the subsurface.

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Clientele

We are happy to announce that our clientele is expanding both within Canada and internationally, moving our software towards a global standard for a modelling and interpretation tool for the world's mining industry. We would especially like to welcome The Solid Earth Physics Department of the University of Athens, the Geological Survey of Norway, Frontier Geosciences of Vancouver, Geothermal Energy Research and Development Co., Ltd. of Tokyo and IRIS Instruments of France to our family of users.

New Members of the PE Crew

Danielle Parker.....B.A.: **Sales Representative**

Viktor Iassinskii.. MSc :Software Develop. Mgr.

Jacqueline Lam... B.Math: Software Developer

Ian Murray..... PhD, Mathematician