

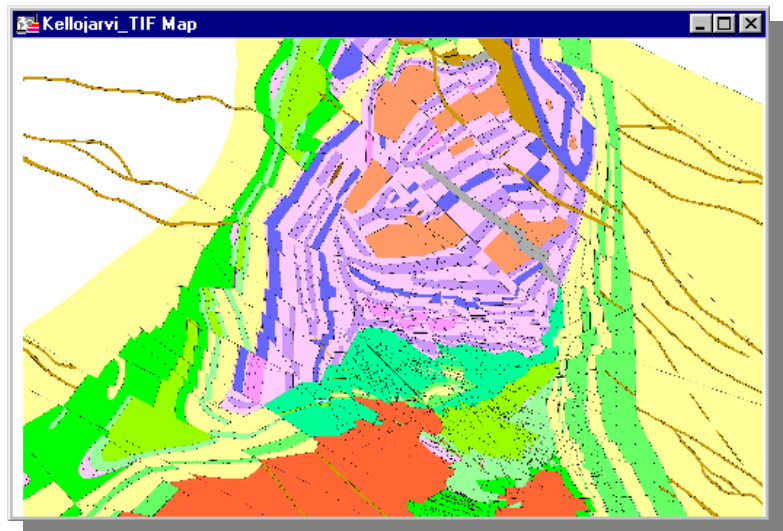
GEONICKEL	<b>Programme:</b> BRITE/Euram, Industrial and Material Technologies Programme, DGXII Technologies Programme	  <a href="http://www.research.softeco.it/geonickel.aspx">www.research.softeco.it/geonickel.aspx</a>  <b>Contacts</b>  <b>Enrico Morten</b> Phone: +39 10 6026 328 Fax: +39 010 6026 350 Email: <a href="mailto:enrico.morten@softeco.it">enrico.morten@softeco.it</a>
	<b>Start date:</b> January 1996	
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	<b>Partners:</b> General Mining & Metallurgical S.A. Larco (GR) Geological Survey Of Greece, IGME (GR) Geological Survey Of Finland, GSF (FI) Iris Instruments (FR) National Centre For Scientific Research "Demokritos" (GR) National Geological Survey Of France, Brgm (FR) Softeco Sismat S.P.A. (IT)	
<b>Keywords:</b> Mineral Exploration, Highly Performant Database Management System (DBMS), Geographical Information Systems (GIS), Knowledge Based System (KBS), Neural Network (NN)		

## OVERVIEW

The main objective of GeoNickel project was the development of **novel geological, geophysical and information technology tools for mineral exploration**, specifically for the nickel which is a strategic metal for the European industry.

While the European countries consume almost two-fifths of the entire world consumption of nickel, the largest nickel ore reserves are in remote areas in other parts of the world. Western European nickel mines, located in Finland, Greece and Norway, satisfy only 9 % of nickel metal consumption.

**The developed GeoNickel's innovative exploration technologies were applied to the identification of new hidden nickel deposits in Europe.**



These technologies were designed to be applied to a great variety of metal deposits thus expanding the potential benefits for the European industry.

One of the first goals of the project was the development of **new models for nickel and their host formation deposits for sulphidic and lateritic deposits.**

Also new geophysical instrumentation and information technology tools were developed in order to increase the efficiency of current geophysical exploration methods in regional, local and deposit scale.

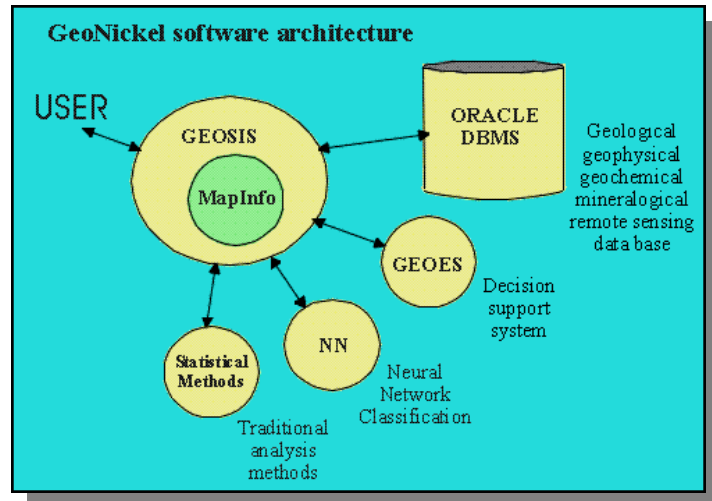
## TECHNOLOGY

The development of information technology tools was focused on the design and implementation of a **GEO-Scientific Information System (GEOSIS)**. Softeco Sismat designed and developed GEOSIS on the base of **state-of-the-art GIS and DBMS technology**.

This system enables the browsing and the analysis of complex data coming from many different scientific disciplines. Geological, geophysical, geochemical, mineralogical and remote sensing data were combined and analysed with advanced techniques.

A **Knowledge Based Decision Support Module** was developed by Demokritos, a **Neural Network classification** methodology and traditional statistical methods was developed by Demokritos and GSF.

GEOSIS is based on a client-server and object-oriented architecture. Two powerful external applications – **ORACLE** and **MapInfo** – supports the GEOSIS server:



- ORACLE allows the management of the Database, through ODBC drivers
- MapInfo allows the management of the GIS functions, through OLE services

The ORACLE Database contains Geological, Geophysical, Geochemical and other data sets used for the mineral exploration. A seamless interface allows access to all the GEOSIS services (which included all the MapInfo functions). This interface was developed with the Microsoft C++ environment and MapBasic, and complied with Microsoft Windows standards.

One of the most important functions implemented with the C++ module manages the communications with ORACLE through the ODBC driver and with MapInfo, through OLE services, and allows a seamless integration of the external software modules.

The advanced GIS functions available in GEOSIS have been implemented using MapBasic, the software development language of MapInfo, and are based on the standard functions of MapInfo. The data entry function of GEOSIS manages the generation of the appropriate script for the ORACLE SQL loader which imports the ASCII file containing the new data which are to be entered into the Database.

The integration of powerful external software packages allowed the fast development of a powerful distributed environment. The adoption of an object oriented architecture allowed an easy integration of external software modules which comply with Windows standards. In this way it was possible to integrate in GEOSIS modules which perform specific functions (for instance 3D modelling) already available on the market.

## END-USERS INVOLVEMENT



**Outokumpu Mining Oy** (Finland) and **Larco SA** (Greece) provided test case data for development and assessment of the GEOSIS / GEOES system.



Data was taken and incorporated into the system from existing mines managed by the two companies.