GIS for PETROLEUM: E&P Geographic Business Solution

Energy is essential for economic progress. Oil, gas and coal are predominant energy sources, contributing with 80% share of the total energy demand. Crude oil is a surprisingly abundant commodity.

In an uncertain and challenging world, discovering and managing new sources of oil ahead of the competition is one of the key ways to staying successful in the petroleum industry. To find new reserves, an oil company must first understand the needed infrastructure, the business conditions, and the environmental factors within the geographic framework.

AEROTERRA has been serving the oil and gas industry for more than three decades. The GIS products and services developed by **AEROTERRA** are designed to store, manage and analyze business objects such as: leases, wells, pipelines, environmental concerns, facilities, seismic surveys and surface geology studies in a centralized corporate spatial database, providing a fully integrated **E&P Geographic Business Solution.**

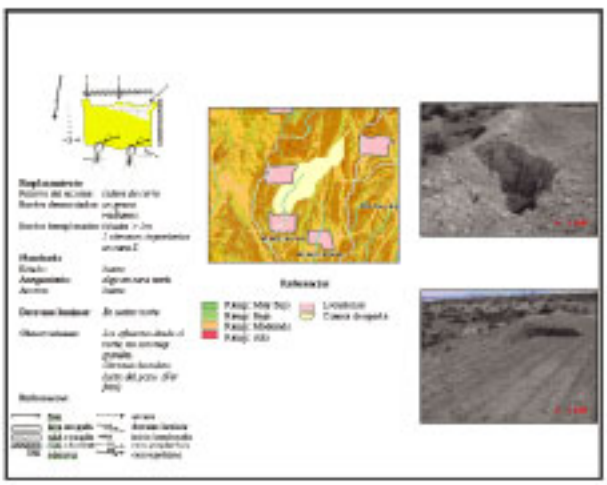
AEROTERRA is a geospatial services organization specialized in the implementation of Geographic Information Systems (GIS) and Remote Sensing technologies. We serve a wide variety of customers throughout the world. With continuous operations since 1973, **AEROTERRA** is recognized as the leading provider of geospatial information services and products in Latin America.

GEOLOGICAL RISK MAPPING

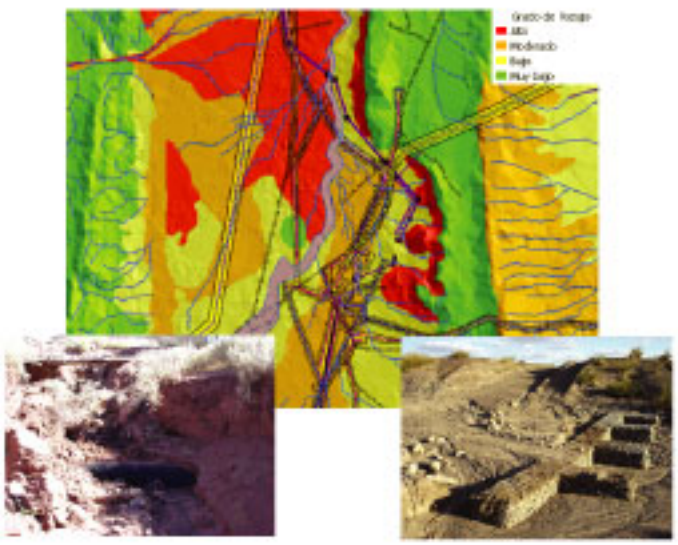
A digital terrain model (DTM) is a digital file consisting of terrain elevations for ground positions at regularly spaced horizontal intervals. An orthorectified imagery is an image which has been processed to correct distortions due to the elevation of the terrain. Using Space Imaging's IKONOS 1-meter Stereo imagery and powerful Leica Photogrammetry Suite (LPS) software, **AEROTERRA** creates digital terrain models and orthorectified imagery.

The Geological Risk Mapping Service provided by **AEROTERRA** combines DTMs and IKONOS imagery allowing the detection of risk zones in order to reduce potential damages to oil facilities and pipelines. The service includes:

- IKONOS 1-meter Stereo models.
- IKONOS 1-meter orthorectified imagery.
- Development of digital terrain model (DTM) derived from IKONOS stereo imagery.
- Hydrologic modelling: provides methods for describing the physical components of a surface. The hydrologic tools allow the user to identify sinks, determine flow direction, calculate flow accumulation, delineate watersheds, and create stream networks.
- Risk Assessment of oil-field facilities



Oil field facility: detailed evaluation of risks

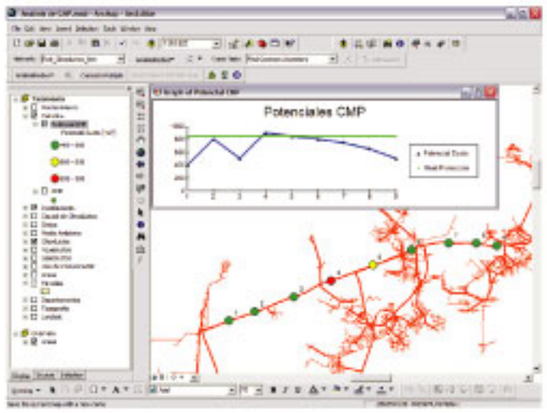


Risk Assessment Map

VIRTUAL OIL FIELD: Reality taken to the Desktop

The term **"Virtual Oil Field"** is used to describe the amazing advances of GIS technology that allows the construction of "virtual" models, making possible the development of a "digital" oil field. For this, it is necessary to use sophisticated and accurate data collection techniques, combined with a collection of GIS Tools developed by **AEROTERRA**.

With the Virtual Oil Field stored in ESRI's Geodatabase it is possible to analyze both facilities and subsurface structures in a common graphic user interface (GUI).



Pipeline Inspection

This GIS application provides comprehensive data maintenance tools for linear referenced pipeline data. It handles the pipeline centerline route as well as the related facilities. It allows the user to visualize, under the same geographic environment, information such as pipes, coatings, meters, valves, pressure tests, line crossings, buildings and structures.

Additionally, it is possible to add data from inspections systems ("smart pigs") and display collected data over the pipeline representation, thus correlating with external geographic features.

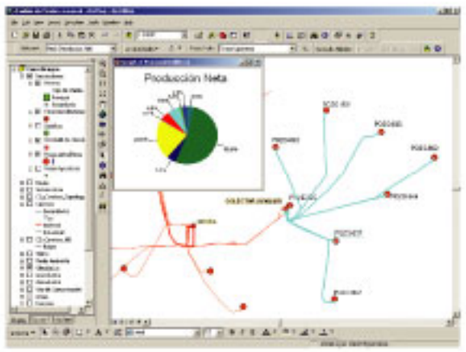
It includes a module that automatically generates pipeline alignment sheets from continuously maintained data sources.

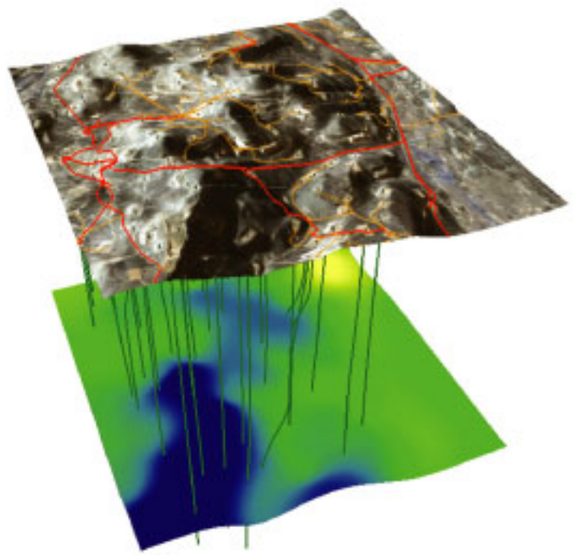
Production Mapping

Through pipeline network modelling, it is possible to build a "Geometric Network" characterized by the connectivity rules and flow direction in the pipes. This network allows the user to make flow calculations and answer questions such us:

- Which wells contribute to this auxiliary collector?
- Through which pipelines does this production flow?
- Which is the flow of crude oil in this main pipeline?

This module is easily integrated with the most popular Production Databases.





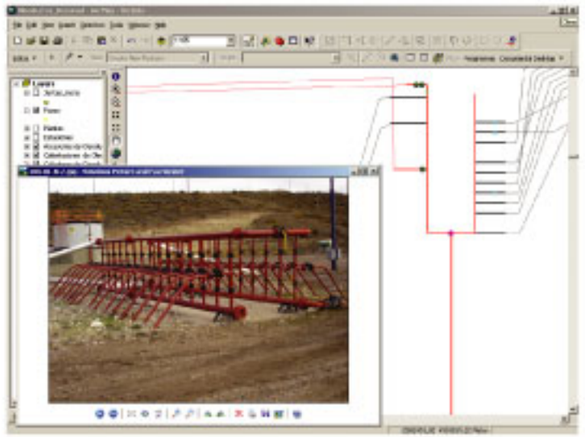
ESRI

Leica Geosystems

Mobile GIS

Based on ESRI's ArcPAD and GPS technology, this application allows the surveying of new facilities and pipelines on the field and can easily be integrated within the ArcSDE Geodatabase.

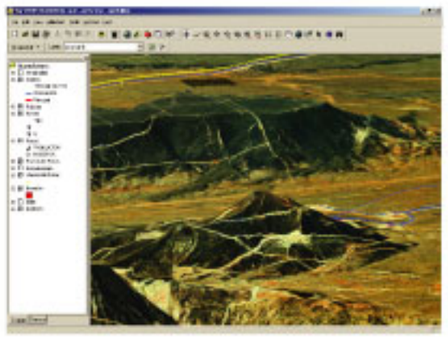
Additionally, a photographic registry of the facilities can be captured and stored, while linked to the devices on the field. During the post-processing step, the network topology is built adding connectivity rules and flow direction to keep the network consistency.

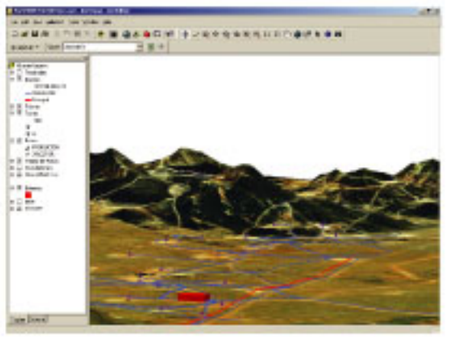


3D Oil Field Analysis

Using ESRI ArcGIS 3D Analyst and Leica Stereo Analyst together with a Data Elevation Model integrated with information of ground and subsurface facilities, it is possible to produce powerful 3D visualizations and perform geographic analysis, which include:

- Soils movements for new facilities
- Topographic profiles
- Line of sight and visibility analysis
- Flooding





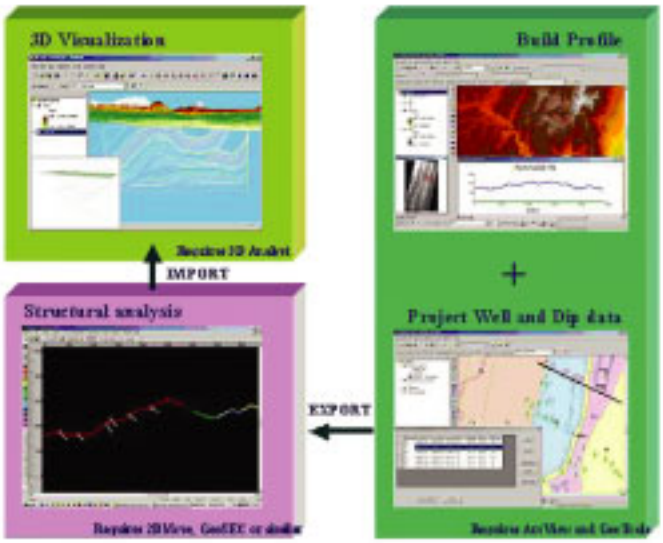
GeoTools: GIS Tools for Geologists

This application provides a sophisticated set of tools which were developed to help analyze geological structures within a GIS environment.

This extension enables users to integrate topographic, lithological and structural information and satellite imagery for structural analysis purposes, creation of topographic profiles, editing of dips and reprojection into selected profiles.

Benefits:

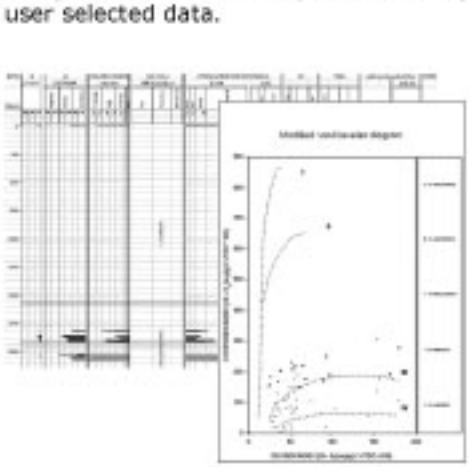
- Reduction of exploration time
- Integration with geosciences tools
- Information available to all users

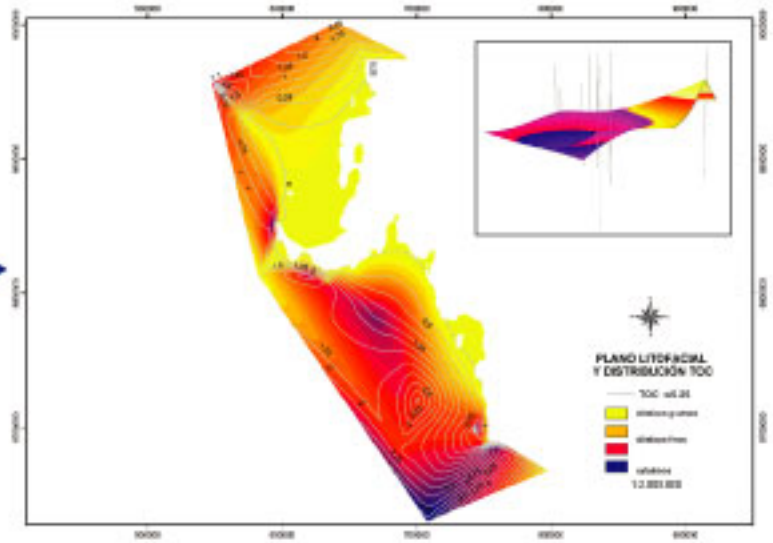


GEOCHEMICAL ANALYST

This powerful tool is useful for geochemical analysis in hydrocarbon exploration. It allows the input and preservation of primary geochemical data within the ArcGIS environment.

Users will be able to add, display and query measurements and biomarkers, associate technical documents, create grids and produce thematic maps. Additionally, geochemical logs and Van-Krevelen Graphics can be created automatically from user selected data.





"Empowering Information through Geographic Knowledge"

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