

FRAC SIS PROFESSIONAL 5.0

2005 COMPUTERWORLD HONORS CASE STUDY

ENVIRONMENT

FRAC TAL TECHNOLOGIES HAS DEVELOPED A NEW GENERATION INFORMATION TECHNOLOGY SOLUTION THAT IS ABLE TO MANAGE, DISTRIBUTE, DISPLAY AND INTERROGATE COMPLEX THREE-DIMENSIONAL DATA AS WELL AS OTHER, MORE TRADITIONAL TYPES OF INFORMATION. [20055244]

SUMMARY

In a world of rapidly increasing amounts of information and demands of communication, we need smarter and more efficient ways to gain maximum value from our data. Fractal Technologies has developed a new generation information technology solution that is able to manage, distribute, display and interrogate complex 3D data and other types of data. Fractal Technologies' flagship product, FracSIS, is the result of more than 6 years of research and development and focuses in particular on the resource industry. Its core value proposition - consolidate, collaborate and communicate.

APPLICATION

The problem:

"You could be getting so much more out of your data – if only you could bring it all together and work with it as one consistent body of knowledge!!"

FracSIS has been designed to promote a change in the business process of Geoscience and facilitates maximum output from data to enable better decisions in exploration and mine extensions through a "best of breed" approach to software. All users of the data, whether exploration managers, company directors or geologists, can view and explore the models, drilling results, geophysics etc. as a unified data set.

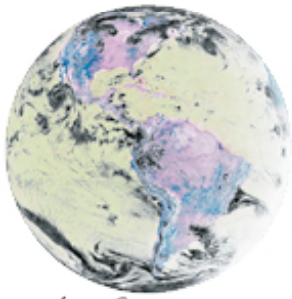
This industry has many scientists using complex specialist packages. Currently there is little or no connectivity between these packages and specialists of different disciplines have limited accessibility to the data of others. To collect and generate these data requires significant expenditure, and the resulting benefits to the customer are limited by the lack of interoperability between the packages used. In addition, the amount of data being generated is increasing as never before. FracSIS provides the solution, with an easy to use scalable integration system designed for multiple data types, as well as a sophisticated viewing environment.

The FracSIS software has no direct parallel, complimenting rather than competing with existing software packages. It is a pioneer in the 3D GIS world, combining 3D Geological Modelling, GIS (geographic information system) and other data types.

BENEFITS

There are many disciplines, particularly those relating to the Earth (Geosciences) where spatial information is fundamentally three-dimensional in nature (e.g. the distribution of minerals under the surface of the Earth). The analysis and information management capabilities that a 3D visualisation and integration system brings to these disciplines results in a new understanding and utilisation of 3D spatial information in the same way that current 2D GIS systems have revolutionised fields such as cartography, demographics, and land management.

The field of GIS software is already well established. All current vendors in this market have products that have been built to provide a 2D "mapping" representation of spatial data – a simple description of current GIS would be a digital mapping system with spatial analysis capabilities. Some vendors have made limited enhancements to their product lines to incorporate a degree of three dimensional data storage, visualisation, and analysis. However, the range of 3D objects that can be represented are limited in these systems and they are only suitable for use in very simple 3D environments. In markets that are dependent on the use of 3D information (e.g. minerals and petroleum exploration,



A Search for New Horizons



Robert Carrigan,
Chairman of the Chairmen's Committee

Ron Milton,
Vice-Chairman of the Chairmen's
Committee

Dan Morrow,
Chief Historian

environmental), there are a range of specialist 3D visualisation and geospatial modelling packages available (i.e. 3D CAD environments). These packages are designed for modelling of objects and not for information management, query, or analysis. Such CAD systems are very adept at designing new objects that have not existed in the world before. A “3D GIS”, on the other hand, needs to be able to construct a model of the world as it exists, including its history, in order to analyse, understand, and manage resources, the environment, and facilities.

Many organisations in the resource sector are faced with a common challenge – how to collaborate across a wide variety of sites, projects and disciplines with a group of people who use a range of different software packages and have varying levels of computer expertise. One client company that has used FracSIS extensively within its organisation explains, “Everyone from exploration managers, drilling program managers in the field, geologists in offices and our managing director uses FracSIS to manage, view and discuss our projects. ...Plus it keeps all of our professionals in touch with the reality of how the data is changing daily and where we can best focus our efforts”.

The value proposition of FracSIS can be simply embodied in 3 C’s:

- Consolidate – where data from a wide range of disparate expert software systems can be brought together into one common data system
- Collaborate – the FracSIS visualisation system facilitates collaborative visual interrogation of the consolidated data. Databases in geographically separated locations can be viewed collaboratively.
- Communicate – the presentation formats of FracSIS allow complex 3D data to be easily shared with other stakeholders, such as partners, investors, government agencies and the general public.

Fractal Technologies has developed three versions of its technology to allow varying levels of user interoperability – FracSIS Reader (an easy to use read-only 3D visualization environment), FracSIS Explorer (a higher level environment with comprehensive 3D visualisation and various output formats) and FracSIS Professional (comprehensive suite of 3D visualization and database management tools, import and export capability and basic CAD tools).

Specific end-user benefits from the software include:

- Ability to import data efficiently. One client comments that “it would have taken us over two days to manipulate and clean the same data to bring it into of specialist packages that we use. FracSIS saved us a lot of time better spent evaluating the project”.
- Visual interrogation of data – with all data in one common database, multiple views allow comparison of various data representation. For example, a geophysicist can compare the results of geological interpretation against the geophysics without needing to be able to use any of the complex specialist geological packages.
- Presentation of data – “Being able to present a cohesive picture of the mine within a 3D environment is crucial to being able to clearly present your idea to any audience”. FracSIS also has several output media, including VRML and the ability to generate animated movie clips.
- Archiving of data – many projects use a variety of data types generated from a range of software packages. With time the location and access to these data can be easily lost. With the ability to store all of the spatial data in one single database, the FracSIS system provides an excellent method for securing data for future use. And with all spatial data in one system, a user need not be an expert in a specific software package to access that data.
- Data validation – as part of the database creation process, there is a suite of data validation tools which can check the data and provide a report back to the user.
- C++ and Python API – FracSIS third party developer APIs have provided many users with the ability to link their own applications to the FracSIS database. One client, a significant research organization, states: “This provides a significant “launch pad” for research projects saving considerable time and effort”.

IMPORTANCE

Choice of database - at the outset of the FracSIS project in 1998, we sought a highly scalable, robust database that handled complex 3D data, and in particular 3D scientific models. After considerable review, Fractal Technologies elected to base its product on an object oriented database, Objectstore, distributed now by Progress Software. This was a novel move at the time in that much of the geoscientific data was stored in relational databases or file systems. The OODB facilitated rapid access to and retrieval of 3D data as objects, which then considerably increased the efficiency of management of that data.

Visualisation – Fractal developed a world class visualization system that delivered an easy to use interface to complex data. In an environment where the volume and complexity of data can be overwhelming, we needed to have a system that allowed users to navigate through data intuitively. In delivering FracSIS, users from all levels of competency are able to work at the level they require. Key

features developed are the capacity for multiple linked views from a common database, visualisation tools for manipulating data such as sections, isosurfaces, transparency, etc, and presentation output including movie (MPEG) and VRML formats. Stereo viewing is also available.

Collaborative visualisation – Fractal has developed a very novel technology which facilitates collaborative viewing from remote locations. This development will be trialled in Canada this year where it will be used to link up mine sites, office locations and other facilities so that scientists can view and share data remotely. This technology will allow mining and exploration companies and other scientific organizations to collaborate in solving complex problems without the need to be in the same location.

Multi-user environment – FracSIS facilitates the concept of multi-user access to a central database. It also provides various levels of access based on the user skill base and needs. Use of a shared database environment allows both specialists and management to access and interrogate the data.

Spatial co-ordinate conversion – with the ability to integrate many different types of data, we developed a conversion tool so that data sets from different spatial reference systems could be combined and converted to other grid systems on the fly. Now, a data set in one grid type can be exported in another grid type automatically. This capacity has removed the often frustrating and prohibitive issue of how one may amalgamate these various data types.

Hardware and operating systems revolution – with the ever decreasing cost of PC's and increasing storage capacity, FracSIS was designed to work in a Windows environment and take maximum benefit from advances in this industry. This has considerably reduced the cost of access to the advanced technology and allows broad application. And now, with enhanced graphics, courtesy of the computer games industry, and increased storage capacity on laptops, a geoscientist can have a mobile office, working around the globe between mines, in the field and the central office.

These developments in technology have provided a fundamental leap for scientists in that they can easily integrate 3D and other data types, and that data can be comprehensively interrogated. Engineers can view geological models, geologists can view geophysics, geophysicists can view geology, geochemists can compare with geological structure models and so forth. FracSIS provides the perfect vehicle for project management, collaboration and data distribution.

ORIGINALITY

FracSIS is a leader in its ability to integrate complex and disparate data types and to manage those data, in particular 3D data. In the early stages of FracSIS development, CAD models of mines and exploration environments were developed in highly specialised packages. There was little or no integration with other data types. While the industry has made some progress in this direction, it remains limited. In addition, the integration of the various data types was limited by various grid formats, some local, so that it required considerable time to convert to a consistent format. In FracSIS, data can be stored in its native format, and be converted on the fly.

Also now in FracSIS, other data formats including Microsoft Word documents, Powerpoint presentations, eXcel spreadsheets, Adobe PDF's, MPEGs and other non-spatial data files can also be stored with the complex 3D models and other spatial data, making it an ideal format for distributing to clients and archiving.

With the technological enhancements and reduction in costs, more scientists are looking to comprehensive systems that can enable greater use of 3D data. FracSIS provides a novel solution to a significant problem in the geoscientific industry by providing a way in which all spatial and non-spatial data can be integrated, interrogated and managed. During 2005, we will be releasing a version of the FracSIS product that will facilitate remote geographic location collaborative visualisation.

Feedback from one of our key clients: "The development work undertaken by Fractal Technologies has supported the simultaneous viewing of all geological and geophysical data and geometries to provide a framework for analysis and interpretation – something not possible in any existing software package. We anticipate that the FracSIS solution will enable us to integrate, visualize and analyse numeric modeling data 3-5 times faster than our previous methods".

SUCCESS

Fractal Technologies has been marketing its FracSIS suite software for the past three years, and has

been successful in selling licences into many of the global mining houses and scientific institutions. The uptake remains predominantly in the “early adopter” market sector and we have yet to achieve broad uptake of the product across organizations. That said, we have successfully exported the product into several countries including the USA, Canada, South Africa, England, Malaya, Peru, Chile and New Zealand while also selling into our domestic market in Australia.

Initially, Fractal Technologies has focussed on the exploration and mining market. The FracSIS product currently enables geoscientists to integrate and visualise complex data from many software packages which traditionally have lacked interoperability. With take up of the product gaining momentum, both in Australia and internationally, our task now is to expand further into the global export market. Fractal has also commenced review of the potential in other markets, including petroleum, defence, land management, oceanography and urban planning.

Fractal Technologies is now building on its existing database and visualisation software to develop a truly 3D geographic information system which will enable a user to model and interact with an uncompromised and realistic representation in a 3D environment. This development, which is now well underway, will provide a quantum shift in the way three dimensional data is managed, analysed and interpreted.

DIFFICULTY

A world of complex 3D data can quickly be confusing if not chaotic. Being able to intuitively navigate through data is essential to beneficial outcomes in assessing 3D data. FracSIS has been designed to be easy to use, and has a visualisation system that most users come to terms quickly.

Cost of product – many organisations, particularly in the mining industry, are reluctant to commit resources to new technology. This is especially so following the significant downturn in this industry over the past 3-5 years. This has also been accentuated by the centralisation of IT procurement in many larger mining houses, where managers of these departments are more focussed on SAP and other business management systems rather than exploration and mining software, where they consider cost savings can be achieved. We are confident that the benefits of our products will overcome this, but in doing so we acknowledge that our price must be competitive.

Distance to a global market – as we are based in Perth, WA, we face the barrier of isolation from much of our core market. The sales group we have in place spend considerable time travelling to global trade shows, and we have also established resellers in the USA, South America and Canada.