GEOSOFT

Technical Paper

More Data, Tighter Budgets and Increasing Competition

Suddenly Simplicity is Looking a Whole Lot Better

Greg M. Hollyer, , M.Sc. (Eng), P. Eng., C.T.W.

Whether you are a technical software user, project manager or senior Earth Science manager, your work is likely challenging you as never before.

For the technical user, rapidly increasing volumes of data and information are driving you to seek greater efficiency and technical awareness – the alternative is to spend more time at the computer keyboard. For the project manager, tighter budgets and demanding projects are motivating you to increase productivity – but often with fewer resources. For the senior manager, competition is challenging you to find new ways of leveraging the skills of technical users, managers and others to meet increasingly focused corporate and/or scientific goals.

Despite these seemingly unrelated challenges, each group shares a common requirement — the need to continually re-think and rationalize an increasingly complex Earth Science environment.

In this quick review, we look at a generic model, called the Earth Science Process (ESP) model, and examine how it can help provide a basic framework for navigating challenges. This article is written to highlight the major software categories — including Data Processing and Analysis (DPA), Specialized and GIS - currently available in Exploration Geophysics & Geochemistry and Environmental Geophysics field.

Linking Process to the Data Life Cycle

Earth Science problem solving can be rationalized into a core set of six processes that we refer to as the Data Stream.

These processes include:

- Measure / Observe
- Import / Quality Control
- Process
- Analyze / Model
- Integrate / Query
- Action

Note that visualization and mapping are not separated into their own processes because they are integral to the entire Data Stream.

When talking with different companies and organizations, we find that each group tends to focus on a specific set of processes but agree on the problem-solving sequence as defined in the Data Stream. The real insight comes when we relate the Data Stream to the Data Life Cycle.

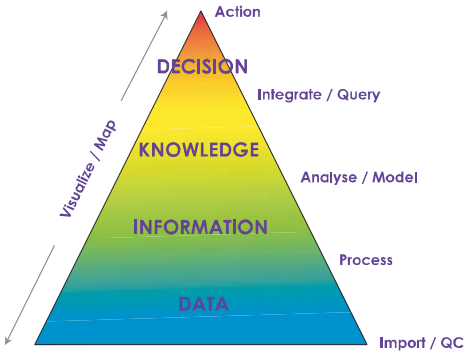

Figure 1
EARTH SCIENCE PROCESS (ESP) MODE

The Data Life Cycle starts with a measurement or observation and continues as data is transformed into the information and knowledge required for decisionmaking. In a geophysical application, for instance, the term data refers to a reading made in an instrument. Processing transforms data into an information product, such as a grid, which the geophysicist then combines with experience and training (knowledge) to solve a particular problem. The final outcome is a decision.

The intent of the ESP model shown in Figure 1 is to relate the Data Stream and the Data Life Cycle via a simple model that can be applied in a number of practical ways.

Addressing the Technical User's Challenges

For the technical user, the ESP model suggests a methodology for increasing efficiency and staying current with technology.

The approach is to first evaluate your problem-solving methods. For example, do you focus on Data, Information, Knowledge Decision-making or a combination of these? If you work only with information (contractor-supplied grids, for instance), how do you evaluate processing quality? What specific tasks do you perform in each Data Stream step? What are the strengths or weaknesses at each step? How are your software tools helping to exploit these strengths or eliminate weaknesses?

This type of analysis provides a structured approach for decomposing problems and recognizing the individual steps to a solution. The ultimate goal is to identify which processes are key and the ways in which technical efficiency can be enhanced.

The ESP model also provides a basic structure for assessing and staying current with new technologies. With more and more systems and features every day, staying on the leading edge of software requires focus and prioritization.

For the data processing expert, your focus may be evaluating how well systems handle a required volume of data. Or, if you work mainly with contractorsupplied airborne grids, your priority is easy access to a variety of information formats and processing tools. If your problem-solving tasks span the Data Stream, software evaluation is intrinsically more difficult. In this case, you may consider whether a single system be effective or how to quickly combine a few core systems into the complete solution required to get your job done.

Addressing the Project Manager's Challenges

For the project manager, success is measured by performance. While there are many pathways to success, performance in today's digital world is inextricably linked to software and the ability of personnel to effectively apply the new generations of innovative tools now available.

In considering performance, the project manager can use the ESP model as a starting point to improving productivity and achieving higher quality results. Key questions to ask include, "Are resources balanced among all processes?" or, "Are resources being applied effectively to the parts of the model that are absolutely critical to project success?"

You may also ask whether high-powered experts are spending too much time on menial tasks, instead of solving problems. A recent IBM study estimated that 60% of professional time in the petroleum industry was spent on clerical duties, such as locating, collecting, collating and analyzing information instead of analyzing it. From talking with our customers, it seems that this statistic applies to mining and environmental industries as well. The bottom line is that you must know which parts of the Data Stream

are not working for you and whether your current software is contributing to or hindering performance.

Another practical use of the ESP model is as a tool for developing training strategies. You may want to start by systematically grouping problem-solving activities within the Data Stream. Then match individual processes to a set of success criteria (i.e. specific productivity and quality measures). The objective of this analysis is to establish your processes and milestones.

Understanding your process, however, is only part of developing a training solution. You may also find it useful to complete a skills inventory and to identify strengths and weaknesses against the ESP model. This analysis can help identify skill gaps within a project team and clearly identify training priorities. The end result is a suite of information and a set of requirements that can be used to focus professional development on individual Data Stream processes and on achieving specific targets.

Addressing the Senior Manager's Challenges

For the senior manager, achieving corporate and/or scientific goals means effectively leveraging the skills of technical users, project managers and others. Strategically, it is imperative to effectively deploy Information Technology and enhance sharing of data, information and knowledge between multidisciplinary groups.

While a senior manager typically does not need to know about specific software features, you must recognize different software approaches and the blend of systems that gives your organization the largest return on its investment.

In Figure 2, we compare major classes of systems – Data Processing and Analysis (DPA), Specialized

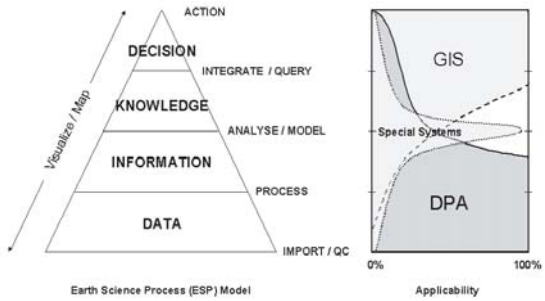

Figure 2
APPLICABILITY OF ESP MODEL

and Geographic Information System (GIS) software — and show their range of applicability.

This figure shows a clear separation of tools within the Data Stream. Perhaps even more importantly, it suggests that you can strategically combine software systems based on the main types of information and tasks performed in your organization.

From a communication perspective, a major area of potential weakness is the link between systems. For data, information and knowledge sharing to occur, professionals who use different types of software must be able to easily pass results to the next group or software system in the problem-solving chain.

Navigating Challenges

Data volumes, tight budgets and competitive pressures are just a few of the issues facing today's technical software users, project managers and senior managers. When the unknown effects of rapidly changing technology are added to the mix, the Earth Science workplace certainly justifies its reputation as a complex environment.

As the number of variables and unknowns increases, however, it becomes even more important to find methods of rationalizing the Earth Science environment and developing personal and organizational systems for navigating your unique challenges.

At Geosoft, the ESP model evolved from our approach to addressing your needs – before developing and implementing a solution, we take the time to decompose and understand the problem. In the bottom line, we hope that you will find that the ESP model can be as useful a tool in your work as it has been to us in ours – helping us to define and develop DPA solutions that address your specific Earth Science challenges.