

Individual Planning System for the Mining Industry

RAG Informatik Develops Customer-Specific CAE Solutions Based on Standard Components

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Efficient technical planning requires the use of increasingly more capable CAE systems together with the integration of design and engineering data (CAE) and operational information (SAP) from the value chain. During the course of development project which lasted several years, a highly efficient geometric-technical planning system was realized for Deutsche Steinkohle AG (a German hard coal company). The system corresponds to the individual requirements and is based on modern, standard components. This demanding CAE development was carried out by RAG Informatik with support from MaK Data System.

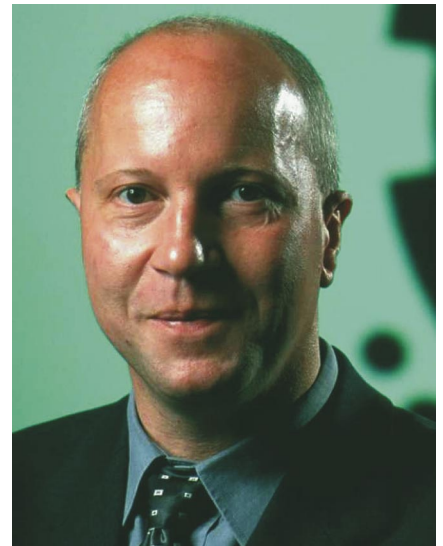
RAG Informatik GmbH, a German limited liability computer technology company in Gelsenkirchen with its associated subsidiary company Saardata GmbH, Saarbrücken and IVS Hückelhoven in Hückelhoven, is the IT service group for the RAG corporation, a leading coal mining company. Over 825 employees of the RAG information technology group design and manage the IT infrastructures of the RAG joint stock corporation as well as a growing number of customers on the corporate external market. Last year, total sales of the IT group exceeded 147 million Euro.

The technical IT area at RAG focuses on the realization of individual solutions to efficiently design a uniform process chain. For this, RAG information technology offers:

- ☛ Branch solutions and customer-specific systems in CAE
- ☛ Integration of CAE and SAP R/3
- ☛ Product data management (PDM) and product lifecycle management (PLM)

The application of proven standard components in the CAE environment, such as Autodesk (or AutoCAD, Mechanical Desktop, Inventor) and the geometric modeling core, Acis, as well as the database, Oracle, guarantee exact tuning of the production line through a uniform and transparent

process chain. RAG Informatik is an authorized dealer and development partner in the area of Autodesk and Acis, offering competent consulting and development services wrapped up in one. Solutions for integration and management of product data throughout the entire product lifecycle are realized with SAP PDM, a part of the R/3 Basic system. All customer requirements can be individually and efficiently realized, from document management and archiving, to complete solutions for product data management with CAD integration.



Members of the project team: (top) Michael Kuczynski, department manager, (bottom right) Mark Diehl, project leader (both RAG Informatik) (bottom left) Dr. Manfred Piennisch, team member (MaK Data System)

Currently, RAG Informatik manages more than 700 CAE workstations.

The Geometrical Engineering Planning System

The geometrical engineering planning system that was realized in this project is the center of the computer supported "markscheiderisch" work which involves underground surveying and measuring

- ☞ for the evaluation and presentation of measurements,
- ☞ for interactive planning and

- ☞ optimization of mining geometry,
- ☞ for construction and analysis of deposit and reserves geometry,
- ☞ for cartographic representation of seam work and presentations as well as
- ☞ providing information for other technical areas.

The tasks of the planning system are divided essentially into two areas: The first is the construction of a logical 3D model of existing and planned underground mining buildings for gas or oil reservoirs. The second area includes the creation of 3D views of operational or DIN (German Industrial Standard)

plans in either ground plan layout or sectional views.

Setting up Logical 3D Models

The existing and planned underground mining buildings (coal mining caverns) are recorded by evaluating the measurement, construction, digitized and manual data input and are constantly updated. Information (point and surface related information of discreet locations in the physical space achieved through on-location drilling or surveying) helps in constructing surfaces from which models of the reservoirs are derived. With this, allowances can be made for the dynamic character of the reservoir model, which continuously changes based on new findings.

Creating Operational and Industrial Standard Plans and Drawings

Freely defined drawings (2D representations) and 3D views can be derived from the logical 3D models. The representations can be displayed on the computer screen or on plots (print outs) to create the operational and legally required technical plans (according to German Industrial Standard 21901). Plans can also be scanned into the system in the case that old plans need to be reworked, if the content and information is not available or only partially available on the database. This hybrid information can be revised and presented together with the current data. An optional, additional graphic processing in AutoCAD expands the revision and reprocessing possibilities.

Engineering Data

The realized solution is a client/server system based on Windows NT/Windows 2000, which allows multiple users to work on the models at the same time with transaction-secured parallel processing. The logical model is saved in a central, relational database providing all users company-

Services of RAG Informatik

As an IT service provider RAG Informatik offers a wide service spectrum in addition to the support in the CAE environment:

- ☞ Consulting for implementation of information technology for designing business processes in all areas of activities
- ☞ Implementation and operation of standard software such as SAP R/3 and e-business solutions
- ☞ Planning, concept and realization as well as operation and maintenance of the complete IT infrastructure ranging from the

network/computer center to the workstation

- ☞ comprehensive know-how for various branches in the mining, chemical, energy, mechanical engineering and automotive industry, as well as construction, transportation and commercial trading

RAG Informatik is a logo certified Customer Competence Center (CCC) and outsourcing partner of SAP. As the first Ixos-CCC in Germany, RAG Informatik is the partner for archive solutions.

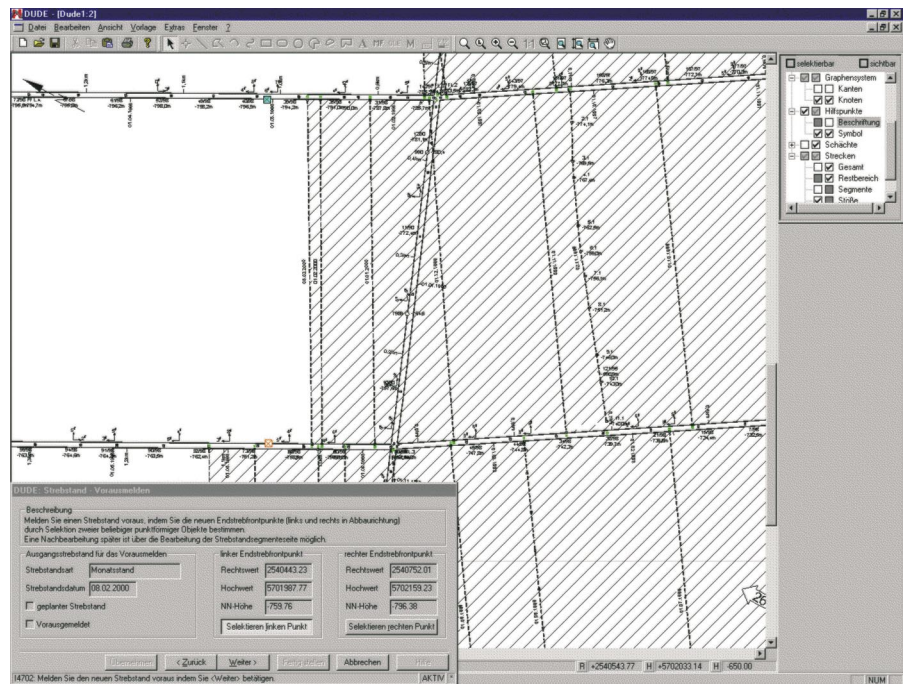


wide with access for comprehensive technical evaluation. This standard allows a cost-efficient use of the hardware and software applications. The system, together with the user surface, forms a homogenous element with a high-level recognition factor for other software products.

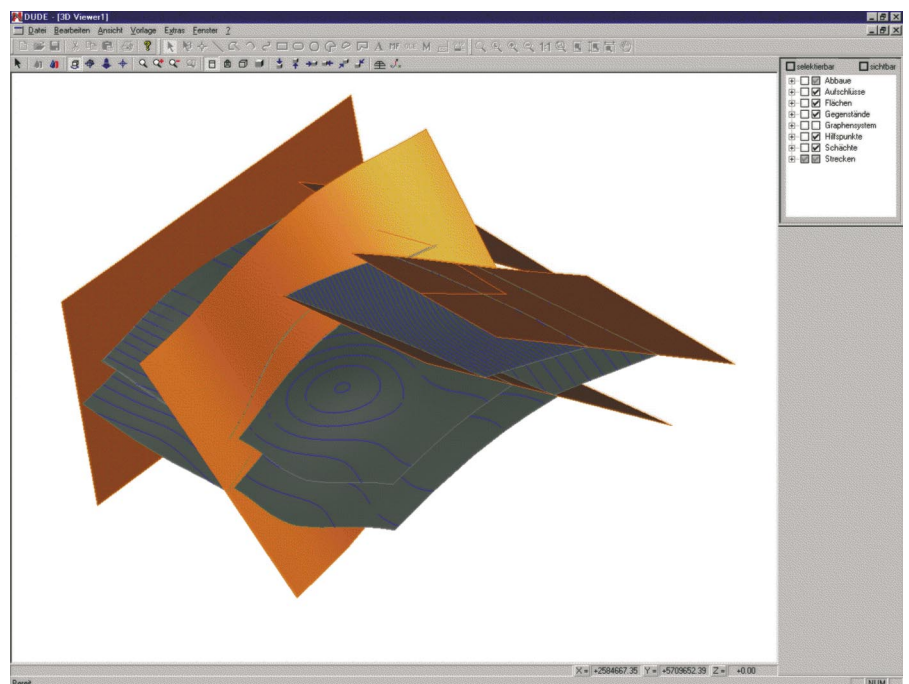
Current Development Status

At the moment a range of functionality and level of maturity have been reached which allows the planning for the practical oriented implementation that will follow. This goal was reached with the motivated support of all those working on the project. Especially the external consultants were confronted with difficult task of familiarizing themselves intensely with the technical issues of the project to support the project work. The close work between project management and the project team, between RAG Informatik and MaK Data System functioned without friction and will be continued for the planned phasing into production.

The requirements for the successful productive operation of the new planning system are, on the one hand, the migration of the existing data which is time consuming and costly, and on the other hand, a smooth system change. To guarantee this, a prototype is currently being used in the practical testing at one of the mining facilities. The successive migration will then follow at other facilities with the support of MaK Data System based on the experiences and information that have been collected during the trial run.



Layout or ground plan depiction



3D view presentation

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