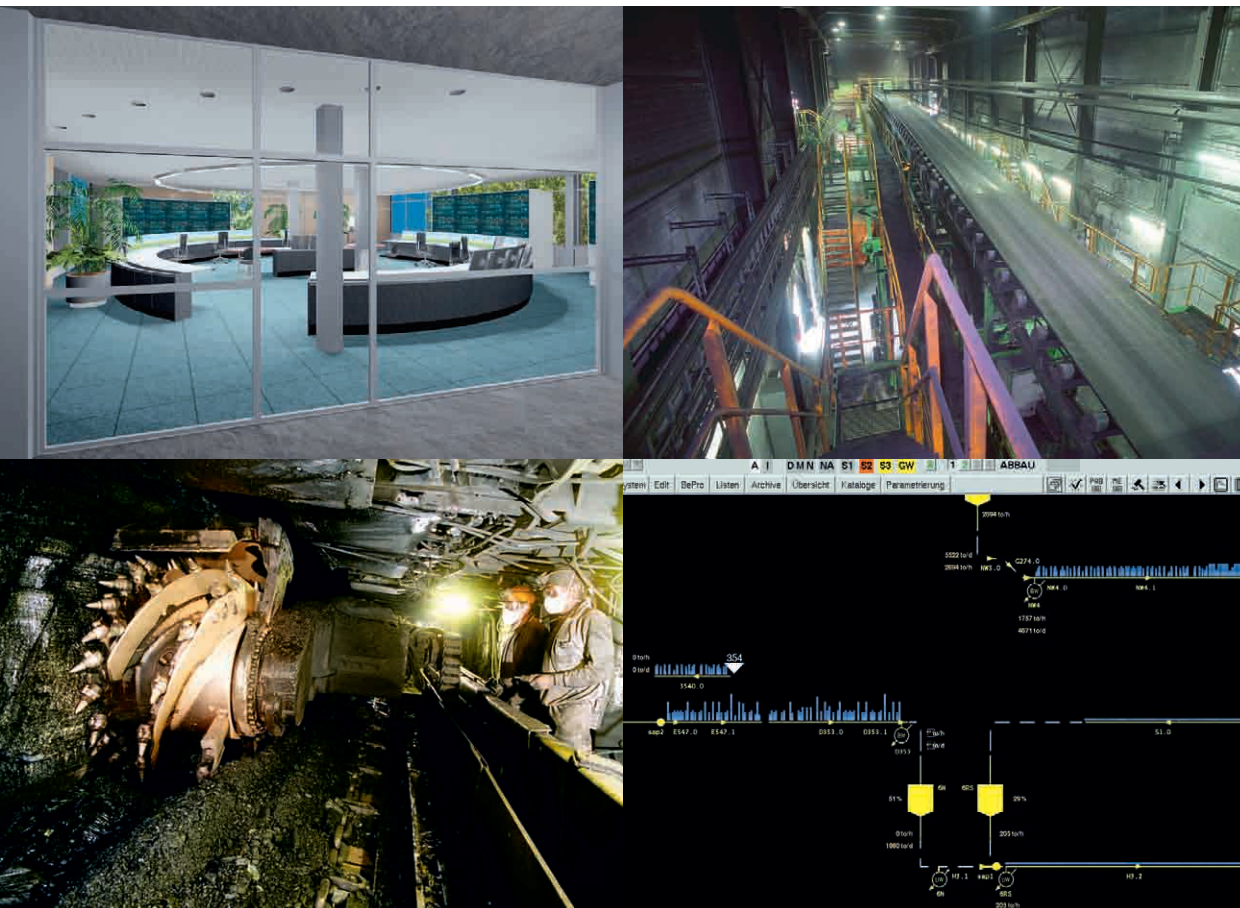


PSI 

RAG
Mining Solutions



We combine intelligence
Mining for Tomorrow
未来采煤融合智能化技术



Future Technology

The German coal industry stands for modern mining at its best – high tech and highly automated. New technologies and new systems are now being deployed under ground and are helping to revolutionise the coal winning process. They are making mining not only more productive but much safer too. Intelligent systems are already available and these are being combined and concentrated into a central location: this is the Central Control Room of the future.

The mine control room of the future – combining intelligence

A huge volume of data from the production process underway below ground gives those on the surface a picture of events as they happen. Today these different processes are displayed and analysed in a number of independent systems. RAG Mining Solutions and PSI Production network and integrate the data in a central control room, which means that all underground production process will be for the first time supervised and controlled by one integrated control system.

This integrated approach is basic for rapid identification of how one set of events can impact adjoining operations, with the result that action can be taken immediately. The efficiency of the entire process chain therefore benefits directly from being able to control individual operations as part of a networked system.

- Coal Winning
- Road Heading
- Logistics
- Repair and Maintenance

The future is already under control.

未来技术

德国煤炭工业拥有的高科技和高度的自动化代表了最先进的采煤技术，地下开采所应用的新技术和新系统改革了传统的采煤工艺，不但增加了开采量，同时安全性能也大大提高。未来的中心控制室就是把现有的智能系统结合起来，集中到中心的位置。

未来的采矿控制室-具备智能化

地下生产过程中的大量数据为地上的生产提供了开采时的画面，在很多独立的系统中能够显示并分析不同的生产过程。德国鲁尔煤业集团矿山系统有限公司和PSI Production的系统网络以及中心控制室中集成的数据，对用户来说意味着地下的生产过程第一次由一个集成的控制系统进行监控。

这种集成方法是快速识别一组事件如何影响相近生产的基础，根据识别结果立即制定对策。因此可以提高整个工艺链的效率，它直接受益于网络架构系统中对单个生产的控制。

- 采煤机
- 井田开拓（隧道施工）
- 物流
- 修理与维护

未来已经在控制中



Control Centre for the coal industry of tomorrow

The Control Centre for tomorrow's mining industry is now being set up in the German coalfields. Data from all RAG collieries flow into this Centre to provide input for the overall control process.

This advanced RAG technology centre is based and established on a number of enhancements of existing control and automation technology. Instead of having a large number of individual detailed views of the different sub-processes all operating data are now collated in a centralised control system. This revolutionary approach can also be applied to your particular set of requirements.

Future capabilities include:

- Processing of all relevant process data in one system
- Application of new methods by establishing data links from previously separate operating areas
- Creation of process transparency for integrated management of all operating sequences
- Cross-functional automation
- Comprehensive information preparation for management
- Prompt decision taking
- Improved diagnostics
- Rapid locating of faults
- Targeted servicing and maintenance

This not only improves productivity but also means better workplace safety and machine reliability.

未来煤炭工业的控制中心

德国的煤田正在建立未来煤炭工业的中心控制系统，鲁尔煤业集团所有数据就进入这个控制中心，为整个控制过程提供数据导入。

先进的鲁尔技术的核心是建立在对现有的控制技术和自动化技术不断完善的基础之上，把所有的生产数据放到一个核心的控制系统中，而不是显示大量生产工艺中不同的生产画面，这种变革性的方式也可以应用于您的特殊需求。

未来的性能包括:

- 在一个系统中处理所有相关的生产数据
- 与之前独立的生产区域的数据建立链接，从而应用新的控制系统
- 集成化管理所有工厂生产排序，创建透明的生产过程
- 具有交叉功能的过程自动化
- 管理所需的综合信息
- 快速决策
- 完善的诊断
- 快速的缺陷定位
- 针对性的服务和维护

这样不仅提高了产能，也增强了工作环境的安全性，设备实现更高利用率。



RAG Mining Solutions and PSI Production: we combine intelligence

The PSImining central management system is being built up step by step as a modular system. All modules are connected amongst each other.

Face control module

- Monitoring and management of coal winning operations with the goal of entire process automation
- Inclusion of geological, ventilation and coal clearance data
- Optimisation of mining-specific routines
- Maintaining the in-seam cutting horizon
- Avoiding dirt generation on the coal face

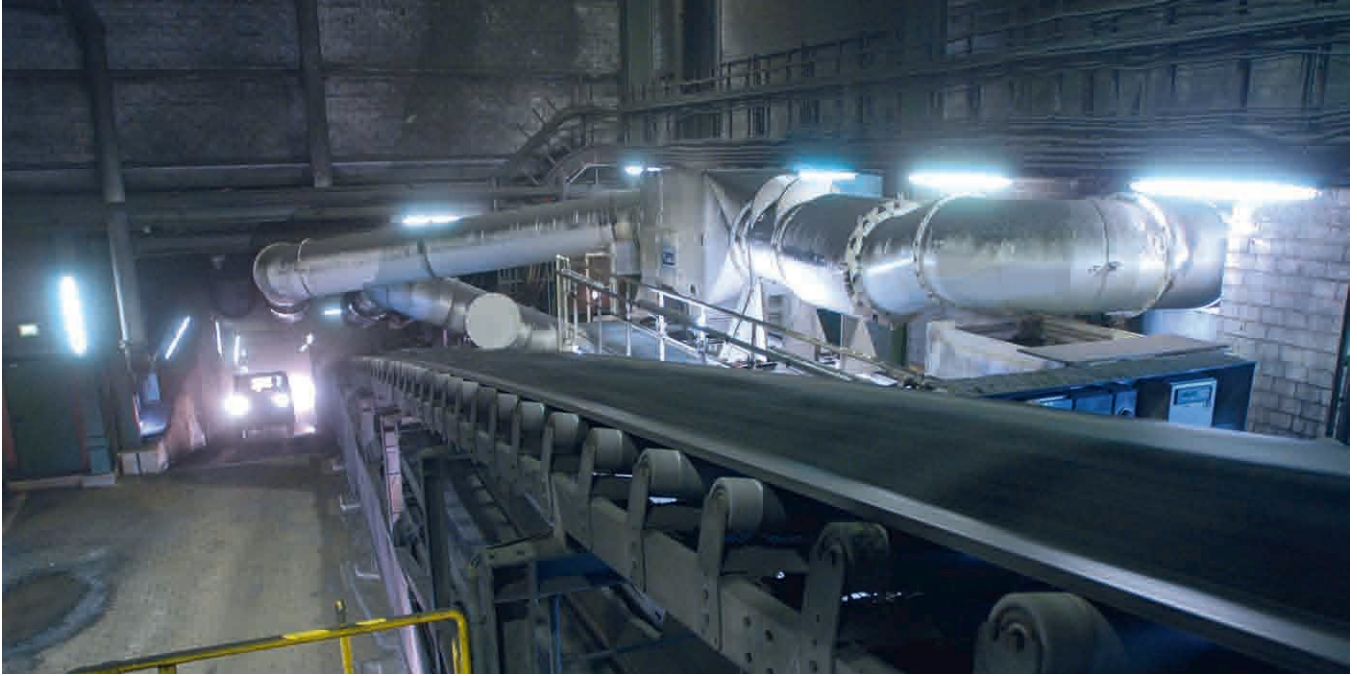
RAG德国鲁尔煤业集团矿山系统有限公司和PSI Production: 我们整合智能

PSImining核心管理系统是以模块化的系统逐步建立起来的, 这些模块之间有接口相互连接。

采煤工作面的控制模块

- 监控管理采煤机生产过程, 以实现整体工艺自动化的目标
- 包括地质数据, 通风数据和煤炭清理数据
- 优化专业采矿程序
- 维护内缝切割面
- 避免采煤工作面的脏乱现象



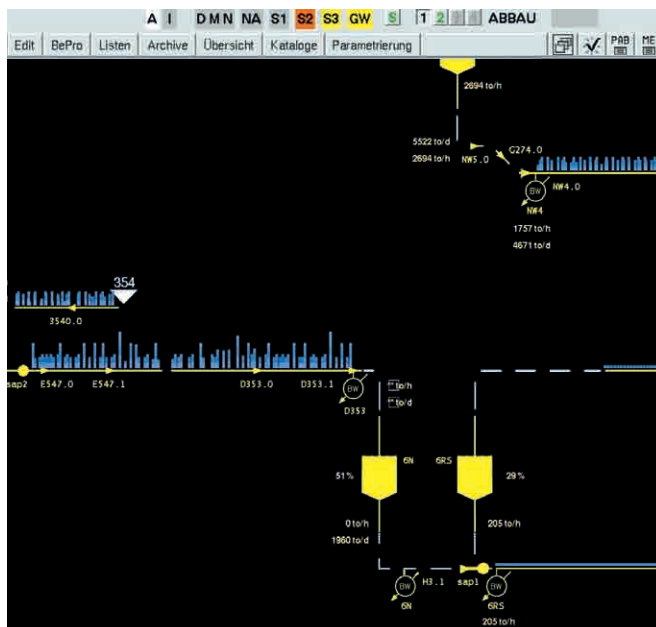


Product clearance module

- Need-based control of the production units as a function of the coal clearance volumes
- Continuous bulk product flow
- Control of the required product quality
- Appropriate visualisation for complete process overview
- Planning and simulation tools

产品清理模块

- 基于生产设备需求的控制是煤炭清理的一个功能
- 连贯的产品流动
- 所需的产品质量控制
- 整个生产过程可视化
- 计划和模拟工具



We combine Intelligence.

我们整合智能

Logistics module

- Monitoring and tracking of transport operations
- Tracing of vehicles and conveyances
- Ongoing recalculation of arrival times (updated forecasts)
- Rapid and targeted intervention to deal with spontaneous requirements and/or transport problems
- Improved delivery reliability
- Reduction in transport costs

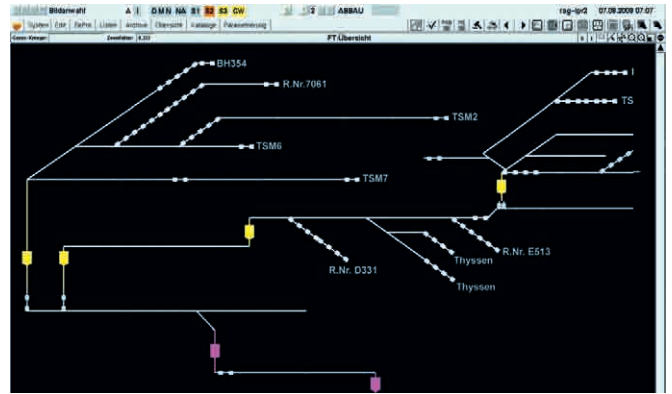
We are now offering the skills that we have developed over the years in the challenging environment of the mining industry to the international market.



物流模块

- 监控和跟踪运输过程
- 跟踪车辆和运输工具
- 对运输到达时间进行实时的再计算(更新预测)
- 快速中断和针对性的中断生产, 处理正常生成的物流需求和运输问题, 或处理其中之一
- 提高交货的准时性
- 降低运输成本

多年来在充满挑战的采矿行业中, 我们所开发的技术知识已经开始走入国际市场。



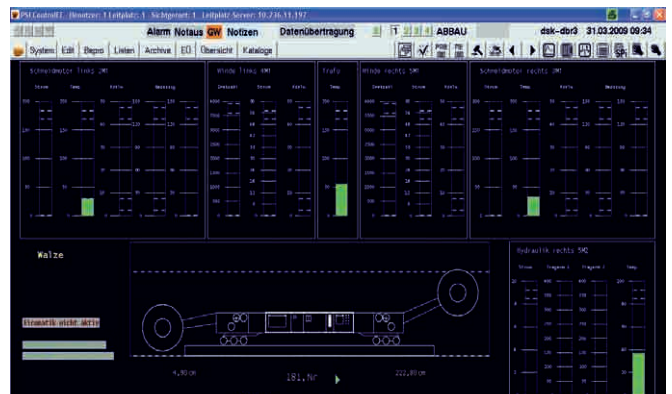
Maintenance module

- Visualisation of machines and equipment
- Equipment status monitoring with error messaging and upcoming repair and maintenance options
- Provision of maintenance-relevant information (equipment and machine data, events history)
- Interfacing to superordinate systems such as SAP (spare parts procurement, materials management)



维护模块

- 机器设备的可视化
- 生产设备状态监控及错误通知, 即将进行的维修和维护选择
- 提供维护相关的信息(机器设备数据, 历史事件记录)
- 与高级系统的网络系统集成, 如SAP(备件采购, 物料管理)



We combine Intelligence.

我们整合智能

Our Services

- Feasibility studies and analysis of mining processes undertaken by specialists with years of hands-on experience.
- Preparation of automation concepts for mining operations (e.g. infrastructure, coal winning, developments).
- Consultancy on the planning, design and implementation of dedicated and central control rooms for managing mining processes.
- Provision of mine consultation services for general operations and specific mining subjects (coal winning, developments, equipment maintenance, logistics, ventilation).
- Identification of potentials for partial or entire automation of processes inclusive design and realisation of the associated process control technology.
- Development of dedicated, technically complex, comprehensive features that are specifically tailored to customer requirements.
- Design and realisation of company wide visualisation concepts.
- Specification, design and implementation of flexible and operator-friendly user interfaces inclusive visualisation concepts, suited for the output using a variety of visualisation devices and formats.
- Set up of demonstrators in order to prove technical feasibility and allow clients to assess the technology transfer process.
- Design, development, testing and commissioning of the application software with provision of technical advice on the system architecture and process interfaces.
- Commissioning and refinement of applications and processes on site.

We combine intelligence

ONE-STOP-SHOP for your mining control centre

我们的服务

- 具有多年行业经验的专家提供采矿工艺的可行性研究和分析
- 采矿生产自动化理念的准备工作（如，基础设施，采煤机，系统开发）
- 对生产计划，工艺设计和煤炭生产管理中心控制室的实施等提供咨询
- 对正常的生产和特殊项目提供采矿咨询，特殊项目包括采煤机，系统开发，设备维护，物流，通风等
- 明确潜在的部分或全部的过程自动化，包括设计并实现相关的过程控制技术
- 为客户的需求定制开发专业的，技术复杂的综合服务
- 设计并实现公司范围内的可视化理念
- 对灵活且易操作的用户界面制定规范，设计和实施，通过多种可视化的装置和格式输出图像
- 组建演示人员进行演示以证明技术的可行性，客户可参与技术转移
- 对系统架构和工艺接口提出技术建议，对应用软件进行设计，开发，测试和调试
- 现场对应用软件和工艺进行调试和改进

具备智能化

一站式的采矿控制中心

We combine Intelligence.

我们整合智能

RAG Mining Solutions and PSI The partnership:

RAG Mining Solutions

RAG Mining Solutions builds on a body of mining experience acquired over many years of operating in the challenging environment of the German coal industry. RAG Mining Solutions now offers this know-how to the global marketplace. You too can profit from our technology lead and our knowledge pool. RAG Mining Solutions develops customised solutions for the world's mining industry.

As well as the automation of mining processes our range of services includes the marketing of reconditioned mining equipment that has been field-tested in German collieries. We also provide targeted engineering, training and consultancy facilities for clients on site. Our motto is simple: 'developed by users, for users'. Various mining-related industrial services complete our portfolio.

PSI

Using software products developed in-house PSI has since 1969 been developing and integrating intelligent solutions and process control systems for the management, control and optimisation of major network infrastructures and complex production and logistics processes. As the European market leader in energy management systems for the electricity, gas, heat, oil and water supply industries PSI's client base includes practically every major energy utility company.

With PSImining PSI Production is now able to transfer to the deep mining sector the decades of experience it has acquired in developing and building efficient process management systems. From highly flexible visualisation through targeted user guidance and centralised, cross-sector data management to superordinate process automation our mining applications are able to draw on a wealth of experience and investment from other markets.



RAG德国鲁尔煤业集团矿山系统有限公司和PSI 合作伙伴:

RAG德国鲁尔煤业集团矿山系统有限公司

基于德国煤炭业在复杂生产过程中多年积累的经验，鲁尔煤业建立了自己的矿山系统解决方案。目前为全球市场提供我们的技术诀窍，您也可以受益于我们领先的技术和我们的专业知识，同时鲁尔煤业为全球采矿业开发客户化的解决方案。

另外，采矿工艺自动化也是我们的服务范围，以及在德国煤矿实地检测过的翻新的采矿设备供应，为客户在现场提供有针对性的工程服务，培训和设备咨询。我们的座右铭很简单：'根据客户需求开发系统，应用于客户'。公司提供各种采矿行业相关的综合服务。

PSI德国

PSI使用自己开发的软件产品，从1969年以来一直致力于为主要的网络基础架构，复杂生产和物流领域的管理，控制和优化方面开发并集成智能的解决方案和过程控制系统。PSI是欧洲电力，天然气，供热，石油和水务等能源行业提供能源管理系统的市场领先者，客户遍及几乎所有主要的能源供应公司。

通过几十年的经验积累，PSI Production的产品PSImining在深层采矿领域已经开发并建立了有效的过程管理系统。我们的采矿应用系统从高度灵活的可视化到针对性的用户指导和集中的，跨部门的数据管理到过程自动化，都充分吸收了丰富的行业经验和来自其它市场的投入。

