# Reproducible Technology Case Sharing

—— **Remote Monitoring and Command Platform for Petroleum Engineering**

**Beijing Anvision Technology Co., Ltd.**

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# Petroleum Engineering Remote Monitoring and Command Platform — Introduction



**The Petroleum Engineering Remote Monitoring and Command Platform** is a comprehensive solution for the all-encompassing data collection and monitoring of on-site equipment status and operations in oilfield operations. It is an integrated platform for petroleum engineering that possesses real-time alerting, issue tracking, predictive analysis, and decision analysis capabilities.

Integrated Remote Transmission at Wellheads
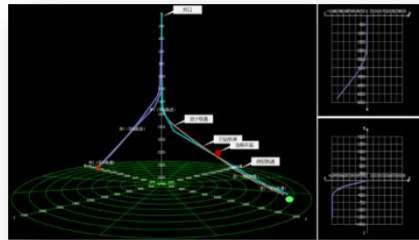
Real-time Directional Data Analysis

Real-time Data Analysis for Logging Operations

Integrated Command Center

Smart Security Solutions

Production Management Daily Reports

Multi-platform Accessibility

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# Petroleum Engineering Remote Monitoring and Command Platform — Introduction

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## Key Features:

➤Covering **data collection, transmission, and storage, enabling data sharing and analysis** across different business scenarios

➤**Dynamic monitoring of on-site operations**

➤**Real-time engineering alerts**

➤**Remote technical support**

➤**Full coverage of petroleum engineering operations**

➤**Loosely coupled, modular architecture, easy to expand**



**Real-time monitoring and Policymaking**

| On-site dynamic monitoring | Real-time engineering alarms | Remote technical support |

**Real-time monitoring** / **Assistant Policymaking**

**Logging**
① Real-time Logging Curve
② Logging Depth Curve
③ Logging Instrument Simulation
④ Numerical Display

**Directional Drilling**
①Real-time Logging While Drilling Curve
②Polar Plot
③3D Trajectory Monitoring
④Data Display

**Real-time production data**
①OGM temperature and pressure
②Export pump pressure
③Real-time level of storage tanks
④Export pipeline temperature and pressure

| On-site Video | Document Management | Data Sharing |
| Daily Report Management | Integrated Communication | Monitoring Log |
| Statistical Analysis | System Management | Mobile Inspection |
| Production Trend Analysis | Dynamic Liquid Level Summary | |

**Data Storage**

**Real-time Engineering Database**

Data-driven / Message channel / Message channel / Message channel

**Real-time data acquisition and transmission**

**Real-time Data Acquisition and Transmission Subsystem**

**Initialization Collection**
| Equipment Model Setup | UDP Collection Setup |
| Com Port Collection Setup | TCP/IP Collection Setup |
| Real-time Data Collection | PLC... |

**Data Recollection**
| Data Integrity Scanning |
| Data Recollection |

**Collection Operation Fault Monitoring**
| Network Monitoring | Transmission Monitoring |
| Data Transmission Log | Data Storage Malfunction |
| Instrument Interface Malfunction | Runtime Monitoring |

**Data transmission**
| Real-time transmission |
| Resume breakpoint |
| Data verification |

**Version Updates**
| Version Management |
| Online Updates |
| ... |

**Multi-instrument Model Adapting Interface**
| SK2000 | SKcms | Cps3000 | wellstar | Sal9000 | SLZ-2A | Advantage |
| HLMWD | DX_COM_PUBLIC | SalServerYljc | DX_UDP_PUBLIC | YL_JCC |
| SEV5150TYB_Udp | SEV5150TYB_COM | JEREH | GSSC-06 | SQ_Dasns | ... |

Remote Data Services

**Real-time Data Acquisition Subsystem**

| Data Reception | System Monitoring |
| Data Reception | Network Monitoring |
| Data Verification | Reception Monitoring |
| Data Integrity Check | On-site Equipment Monitoring |
| Data Storage | Database Status Monitoring |
| Data Distribution | **Reception Log** |
| Data Encryption | Transmission Job Log |
| ... | Log Browsing |
| | Data Reception Log |

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# Customer Pain Points

### Difficulty in On-site Operation Monitoring

Data Acquisition Challenges, Unable to Grasp Real-time Situations

### Challenges in Controlling Operational Risks

Inability to Adjust Operation Strategies in a Timely Manner, Lack of a Unified Risk Management Platform

### Lack of a Unified Management Platform, Inability to Share Data

No Unified Platform, Inability to Share and Apply Various Production Data

### Difficulty in Adjusting Production Strategies

Inability to effectively share data, impacting the timely adjustment of production strategies

### Challenges in Controlling Operation Quality and Efficiency

Struggles in real-time monitoring and adjustment of operation quality and efficiency

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# Project Background and Market Opportunities

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## Real-time Video Surveillance

On-site drilling operations include real-time video surveillance, providing operational and management personnel with intuitive visual insights into the field.

## Real-time Data Monitoring

On-site drilling operations feature real-time data monitoring, effectively identifying anomalies and efficiently sharing job status to ensure safe operations.

## Enhanced On-site Work Quality and Efficiency

Enabling the monitoring of on-site personnel's work quality contributes to the effective enhancement of operational efficiency.

## Unified Platform, Collaborative Sharing

Implementing a unified platform management system facilitates visual sharing among personnel in different roles, thereby enhancing overall work efficiency.

## High Compatibility Expansion, Unified Reporting

Supporting data integration from various drilling machine brands, the system achieves unified reporting management.
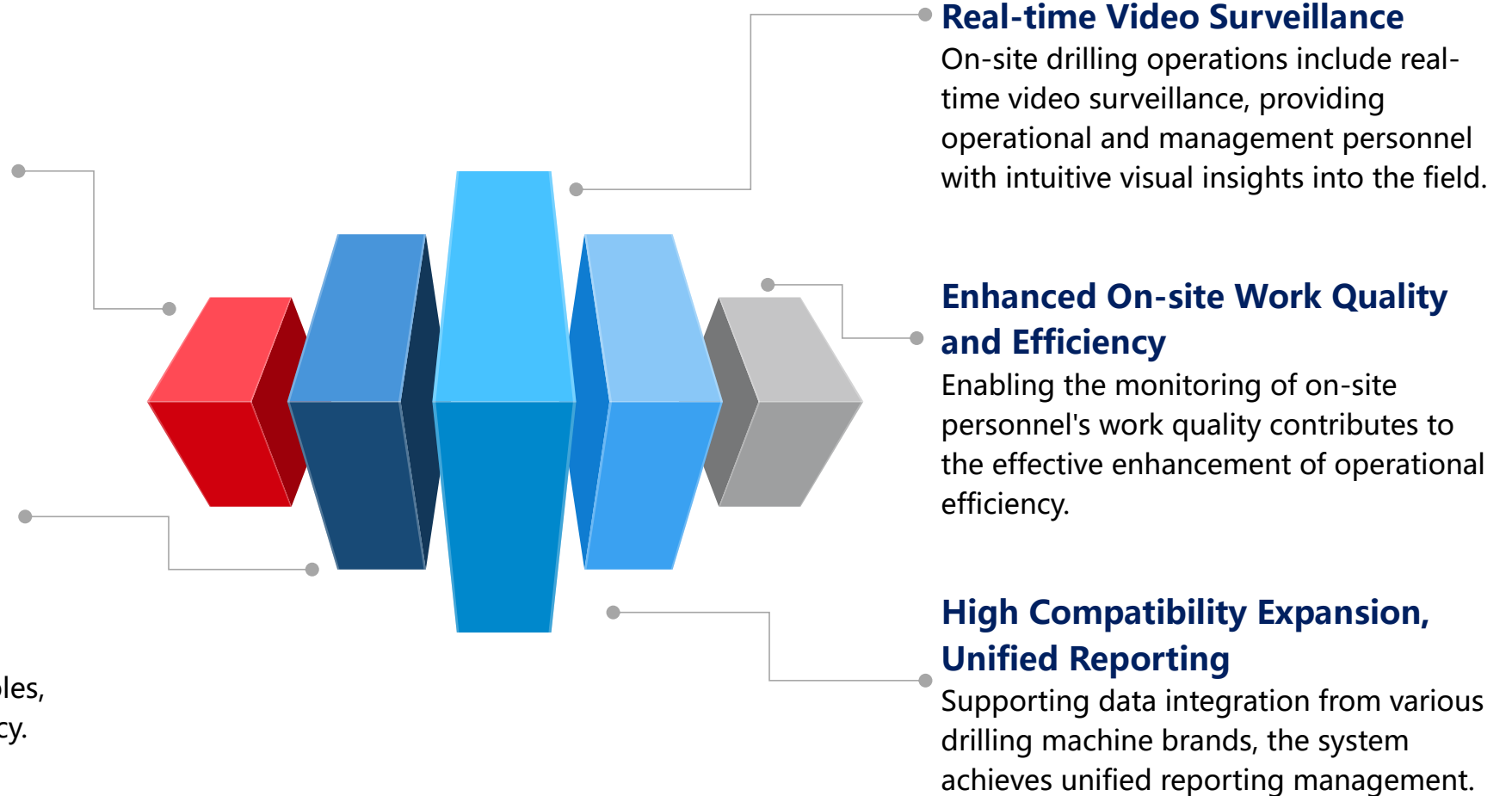
*An efficient, intelligent, and secure Petroleum engineering operation management tool, aiming to achieve more efficient on-site operations*

# Contents

> **Introduction to the Platform**

> **Petroleum Engineering Remote Monitoring and Command Platform**

- **Integrated Command Center**

- **Real-time Data Monitoring**

- **Daily Report Management**

- **Smart Security System**

- **Data Sharing**

- **Mobile Application**

> **Summary of Technological Innovations**

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# Functional Modules

## Data Acquisition
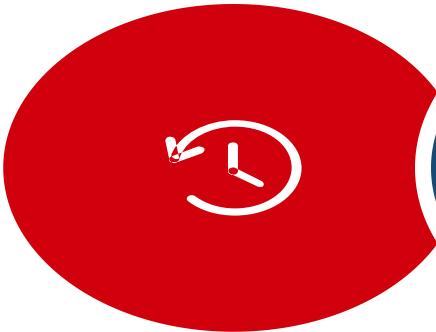
### Real-time Capability

➢ Efficient and instant data collection
➢ Achieving **data collection and return per second**
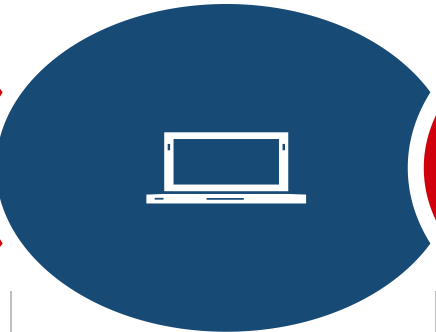
### Compatibility

➢ Compatible with **30** types of drilling parameter instruments, over **30** logging instruments,
➢ Support common large-scale fracturing devices and directional instruments,
➢ **Support customization options.**
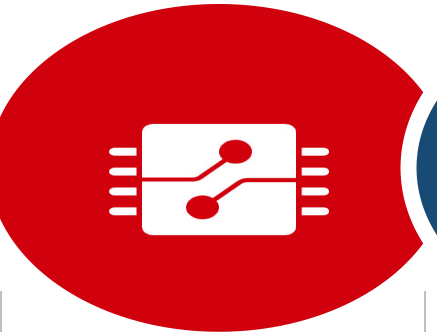
### Comprehensiveness

➢Includes real-time (**drilling, directional, fracturing, etc**.), daily reports, and video data for detailed analysis.

### Ease of Use

➢**One-time configuration**, permanently synchronized with the drilling machine
➢**Eliminating the need for repetitive operations.**
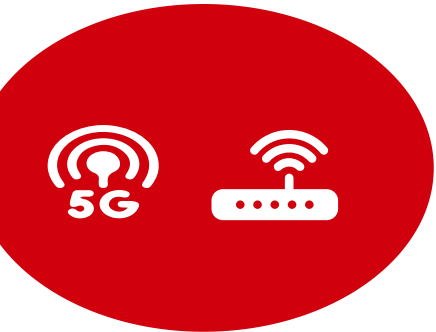
### Network Adaptablity

➢Supports **ZigBee**, 4/5G, WIFI, WAN
➢Ensuring **stable operation** under different network conditions.

● **Field**
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**Automatic Collection**

● **Data collection nodes**

● **Automatic Storage**

**Data Management**

● **Standardized Dumping**
● **Necessary Audits**

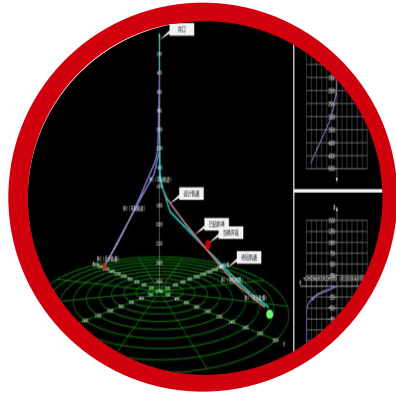● **Electronic Documentation**

● **Standardized Information**

# Functional Components

## Data Analysis



## Comprehensiveness

➤ Includes engineering data (drilling, directional, fracturing, etc.), HSE data, and video data analysis
➤ Enabling users to gain a comprehensive understanding from multiple perspectives.
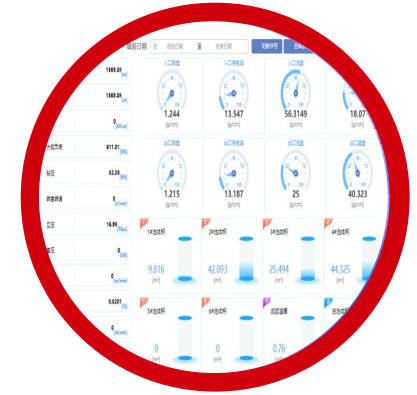
## Professionalism

➤ Offering various professional graphics and charts related to petroleum engineering
➤ Help users in interpreting complex data patterns and trends effectively
➤ Supporting multidimensional and multi-professional analysis

## Visualization

➤ Various forms of graphical data display.
➤ Make complex data easier to understand and remember

## Usability

➤ Providing diverse analytical components that are intuitive and user-friendly,
➤ Allowing even non-professionals to effectively utilize the data

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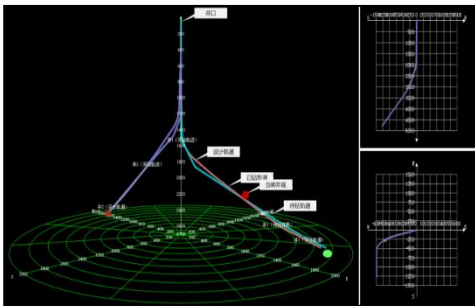
# Functional Components

## Early Warning Monitoring

### Real-time Fracturing Alert Iteration

Through sensors and data analysis, predict and alert potential issues during the fracturing process.

### Directional Drift Alert

Real-time monitoring of the underground equipment's movement direction to prevent drift accidents.

### Drilling Progress Alert

By analyzing drilling data, predict drilling progress to facilitate adjustments to operational plans.
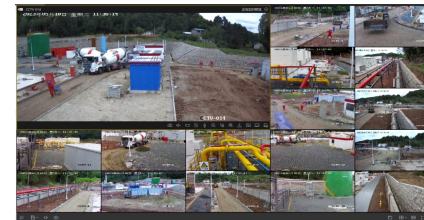
### Mud Ratio Alert

By monitoring mud ratios, prevent underground accidents caused by improper ratios.

### AI Video Alert

Analyze real-time drilling site videos to alert potential risks.

### On-site Consumables Alert

Through monitoring equipment operating status and consumables usage, proactively alert shortages of consumables.

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# Functional Components

## Integrated Visualization Dashboard



| Real-time Data Display | Multi-source Data Integration | Efficient Data Analysis | 3D Visualization | Customization and Flexibility |
|---|---|---|---|---|
| Instantly showcase various production data and equipment information, ensuring prompt response to decision-making scenarios. | Integrate data from diverse sources: sensor data, real-time monitoring, statistical information, etc. | Efficient data processing and analysis to help users extract valuable information from large datasets. | Real-time reflection of the actual wellsite production process, achieving three-dimensional visual representation. | Customize displayed content and formats as needed, including charts, maps, video streams, etc. |

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# Functional Components

## Mobile Application

- **Comprehensiveness:** Comprehensive functionality and rich content.
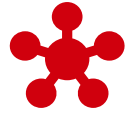
- **Compatibility:** Wide support for devices and operating systems.

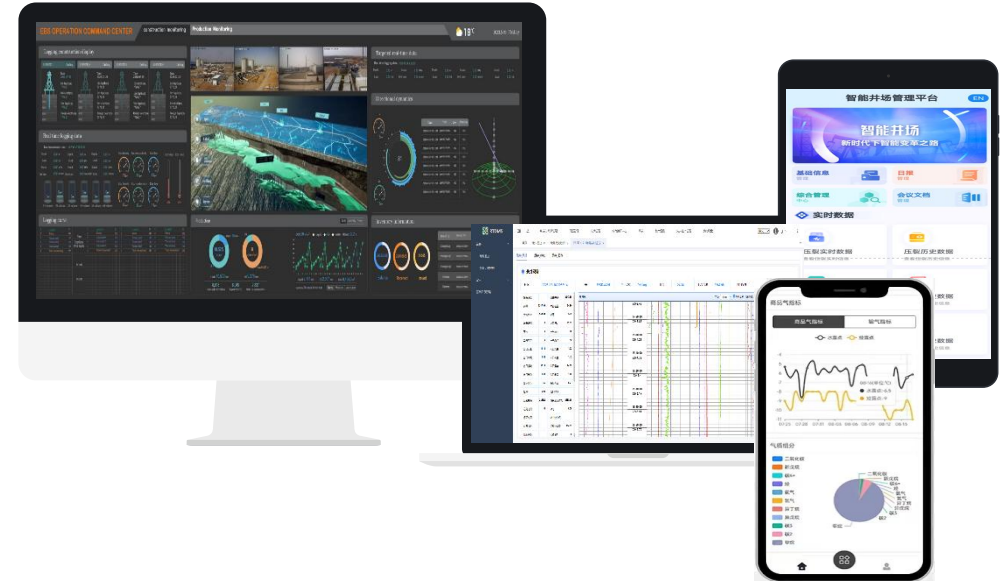- **Usability:** Intuitive and easy-to-navigate user interface.

- **Data Security:** Robust data protection and privacy security.

- **Response Speed:** Fast and seamless user experience.

- **Network Adaptability:** Stable performance, adapting to various network environments.



HarmonyOS

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# Functional Components

**Collaborative Sharing**

**Large Screen Display Terminal**

**PC Management Monitoring Terminal**

**Mobile Portable Terminal**

**Terminal Sharing**



**Role Sharing**

**On-site Operations Personnel**

**Resource Management Personnel**

**Management Decision Makers**

**Environmental Monitoring Personnel**

**Safety Supervisors**

**Data Sharing**

**Database**

**API Interfaces**

**Data Security**

**Data Standards**

✓ *Data Sharing, Data Standards, Data Security*

✓ *Decision Support, Collaborative Cooperation, Efficiency Enhancement*

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# Functional Components

**ANVISION**

## Smart Command Center

- **Rapid Implementation:** Based on Anvision's global supply chain, utilizing modular and fast deployment for easy integration, enabling quick initiation and application.

- **Visual Experience:** Offers an intelligent integrated audio-video control system with dual LED HD large screens, supporting 8K displays.

- **Intelligent Devices:** Provides a smart paperless meeting system supporting document organization, schedule management, status reminders, and tablet interactive operations, facilitating data retrieval and sharing.

- **Data Fusion:** Integrates information from multiple sources, displays real-time data streams, facilitating comprehensive analysis and monitoring.



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  - • **Data Sharing**

  - • **Mobile Application**

- ➤ **Summary of Technological Innovations**

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# Summary of Technological Innovations

**ANVISION**

**Comprehensive Coverage Across All Professions and Scenarios**
Encompassing various aspects of petroleum engineering, including drilling, side-logging experiments (logging), and other critical operations, Monitoring and managing the entire process from exploration to production.

**Multi-Protocol and Extensive Compatibility**
Seamlessly integrating multiple devices, software APIs, and supporting various data formats and communication protocols to ensure effective communication between different devices and systems.

**Innovative Interactive Interface**
An intuitive user interface that simplifies complex operations, enabling even non-professionals to use the system with ease.

**Intelligent AI Analysis and Alerts**
Utilizing data analysis and machine learning algorithms to monitor operational status in real-time, promptly detecting anomalies, issuing early warnings for potential risks and faults, and assisting in taking preventive measures.

**Multi-dimensional Visualization Dashboard**
Diverse data visualization tools making complex data and analysis results easy to understand, empowering clients to better comprehend and manage on-site situations.

**Multi-role, Multi-terminal Collaborative Sharing**
Supporting team collaboration, enabling real-time information sharing and operational coordination among staff in different regions and departments. Providing a secure data sharing mechanism to ensure information security and permission management.

# Committed to Making Digitalization in the Oil and Gas Industry Simple and Practical