Automated, Real-Time Monitoring, Management and Visibility of your Underground Operations

› INCREASE Equipment utilization and productivity
› MAXIMIZE Material movement
› REDUCE Waste and operating costs
› MANAGE Development and production processes
› TRUST More than 25 years of underground mine management experience
By providing increased levels of visibility, flexibility and adaptability, the DISPATCH Underground system offers a holistic view of your underground operations.

**INCREASE EQUIPMENT UTILIZATION AND PRODUCTIVITY**

› Track equipment location via RFID tags or GPS  
› Monitor changes to equipment operational status  
› Ensure that equipment is in the right place at the right time via active task management

**MAXIMIZE MATERIAL MOVEMENT**

› Monitor production target progress through automated tracking capabilities  
› Inherit density and grade data from source locations  
› Maintain material quantities and qualities between survey intervals

**REDUCE WASTE AND OPERATING COSTS**

› Alleviate workflow bottlenecks through automated sequential task assignments  
› Reduce non-productive equipment travel and idle time  
› Minimize reaction times to draw point hang ups, ore pass blockages, and other delays at the working face

**ENHANCE OPERATOR SAFETY**

› Utilize paperless Prestart checklists to ensure operator accountability for assessing equipment condition  
› Review Pass/Fail Prestart checklist items on a per-unit basis to confirm that equipment is safe for operation  
› Broadcast emergency alerts from equipment operators  
› Use login credentials and training records to verify operator qualifications for specific equipment types
UNPARALLELED VISUALIZATION

MINEGRAPHICS

The MineGraphics perspective provides mine operations personnel with an enhanced visualization of current underground activity. With MineGraphics, users can:

› Visualize equipment movement in real-time
› Illustrate mine locations and tunnel networks in section view and plan view, simultaneously
› Display .dx files from modeling software as separate layers
› Filter by elevation, equipment types, location types and more

MOBILE APPLICATION

A mobile device installed in the cab of each equipment unit provides the operators’ primary interface with the DISPATCH Underground system. Pre-configured equipment types include:

› Load haul dump (LHD)
› Underground haul truck
› Production drill
› Development drill
› Roof bolter
› Explosives truck
› Mechanical scaler
› Light vehicle
› Auxiliary units

Each mobile device includes large buttons, operator-selectable color schemes, and a crisp, 7” high-resolution display. The user interface of the mobile application is specifically designed to accommodate low-light environments.
SYSTEM HIGHLIGHTS

TASK MANAGEMENT

Task Management handles all tasks and work orders assigned to the mobile fleet. By automating any development or production process workflow, Task Management easily creates and monitors the progress of all scheduled tasks to:

- Reduce the need for manual task assignments and reassignments
- Minimize delays within the process
- Synchronize sequential tasks

When paired with the optional Location Reason Codes module, management of the horizontal mining process and associated tasks becomes seamless.

The Location Reason Codes module also:

- Enables the DISPATCH Underground system to inform operators of new tasks as location conditions change in real-time
- Provides context-specific location status information based on location and equipment type
- Allows operators to advance stages of a work cycle based on the location status of the working face

LOCATIONS

The Locations module enables Dispatch Engineers to create hierarchically-structured (parent/child) lists of the locations within the mine.

The hierarchical locations structure provides the operator with an intuitive navigation tool that presents contextually relevant information based on the equipment’s current tracked position.
TIME TRACKING

The Time Tracking module enables dispatchers to monitor equipment and location activity, utilization and availability. Status Tracking, the primary method of Time Tracking, enables operators to quickly alert dispatchers of changes to equipment or location status. Available status options are as follows:

› Ready
› Delay
› Standby
› Down

Statuses are further broken down into reason codes, which can then be re-mapped into Time Categories for reporting purposes. Examples of Time Categories include:

› Productive
› Non-Productive
› Planned Maintenance
› Non-Planned Maintenance

SYSTEM HIGHLIGHTS

EQUIPMENT TRACKING

The Position Tracking module provides real-time, discrete equipment positioning via strategically-placed RFID tags affixed to underground mine infrastructure. Rugged RFID tag readers are installed on every mobile equipment unit.

The optional Switchable RFID/GPS feature enables the positioning of underground equipment units that also operate on surface using both RFID and GPS sensors. The bi-modal positioning system automatically determines when to utilize each technology.

Equipment positions are plotted in real-time against a mine map in MineGraphics. Visualization tools enable historical playback of equipment positions.

Main Features

› Real-time, automated production, time, and operator tracking
› Visual equipment and critical locations monitoring
› Integrated task management
› Wireless 802.11 and SIAMnet communications network compatibility
› Rugged, purpose-built mobile field computers for development and production equipment

Equipment Time Records

Location Time Records
CREW MANAGEMENT

Personnel tools are available to define crews, shifts, and crew rotations; create and export crew rotation calendars, and schedule shift line-ups:

- **Shifts** – Adapt the DISPATCH Underground system to most shift time schedules.
- **Crew Rotation** – Schedule crew rotations and define site-specific intervals, such as: 4 on/3 off, 7 on/7 off, or 14 on/14 off.
- **Mine Calendar** – Display crew rotations and idle days in a monthly calendar format. Publish in .ics format for distribution to employees. Import into applications such as Microsoft® Outlook®.
- **Line-Up** (optional) – Identify equipment location at shift change and make equipment assignments for the incoming crew.

MATERIAL MANAGEMENT

The Material Inventory module maintains material quantities and qualities between survey intervals in real time. Following a blast, ore control personnel can update material inventories as required. The system will then automatically track material inventory levels, grades, and densities as material is added or removed from a given location.

Track critical operational parameters such as tonnage, volume, and grade, for material movements between all locations, including:

- **Headings**
- **Stopes**
- **Stockpiles**
- **Ore passes**
- **Draw points**
- **Crushers**
The optional Draw Cards module enables dispatchers to distribute a Block Cave draw point extraction plan to LHD mobile field computers. Use the Draw Cards module to:

› Present LHD operators with individual assignments according to the draw point extraction plan
› Simultaneously monitor extraction progress for all active draw points
› Provide supervisors with a visual representation of any deviation from the original extraction plan
› Carry forward any unfinished work to the following shift to maintain the integrity of the extraction plan

Draw Cards: Central and Mobile

Relevant Data. Real-time Transmission.

The DISPATCH Underground system actively delivers relevant information to each mobile equipment unit, assisting operators in making informed decisions based on current conditions.

**Communications** – Use an existing distributed 802.11 (Wi Fi)-compliant antenna system or other wireless data network to communicate between mobile equipment and the DISPATCH Underground system central server.

**Position tracking** – Track equipment locations underground using strategically-placed RFID tags affixed to mine infrastructure. Rugged RFID tag readers are installed on all mobile equipment units. Modular’s approach to RFID equipment tracking presents an affordable, granular deployment of an RFID network.
COMPREHENSIVE DATA MANAGEMENT

STORE&FORWARD

Store&Forward ensures that data integrity is maintained when equipment travels outside the wireless data network. While operating without communications, all event data is stored on the mobile device and automatically forwarded to the central server when communication is restored.

With Store&Forward:

› Stored and forwarded data is seamlessly integrated into existing central database records
› Communication disruption causes no discernible difference in operation
› Uploaded data is reconciled in real time upon reaching the central server

DATA IMPORT AND EXPORT

The Data Import/Export solution enables data import from third-party mine planning applications (for example: ERP systems such as SAP® and Oracle®; Excel, and mine-planning tools) into the DISPATCH Underground system. Import profiles are used to map comma-delimited ASCII file data to fields in the DISPATCH Underground system database. Error-prone manual data entry can be reduced by importing:

› Equipment tasks, production schedules and draw cards
› Mine locations, personnel, and equipment units

The solution also enables data export of the following historical records into a spreadsheet or comma-delimited format:

› Equipment cycle records
› Drilling records
› Material records

REPORTING

The DISPATCH Underground system utilizes Microsoft SQL Server Reporting Services (SSRS) to enable real-time and historical reporting of the mining operation. The standard reports package includes several reports for current or past shifts, or a range of shifts, with a focus on the following key areas:

› Production accounting
› Time accounting
› Safety
› Mobile activity

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