

Thunderbird is introducing its new Integrated Mining System (IMS) which includes HPGPS Drill Guidance for blasthole drills. This product has been designed from the ground up by an experienced team that has previously been involved in the development of production drill monitoring and GPS guidance systems. This background has allowed the team to design a system with many unique features not available in competitive systems that will provide its customers with a higher rate of return on their investment.

IMS Mobile

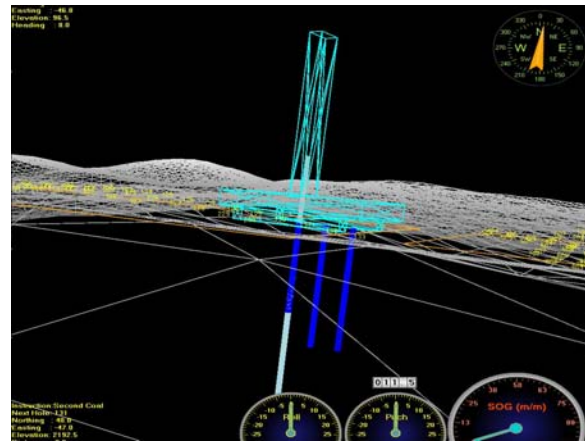
IMS Mobile is a family of products with options to include:

- Drill Monitoring for increased productivity
- Drill Guidance for more accurate drilling
- Augmented GPS for more drilling time when satellites are unavailable
- Strata Recognition using Specific Energy algorithms for improved blasting
- Rock Recognition for material blending
- Interface to any Windows device for viewing of the drills or emailing by supervisors
- Supports radio remote tramming of drill with second display
- Health monitoring for improved drill life
- Interface to drill PLC systems
- Camera ready for added safety
- Base platform for future upgrades to remote or autonomous operation



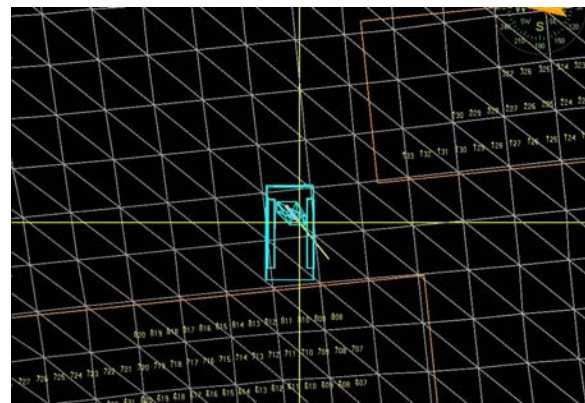
Interactive Operator Display

- State-of-the art user interface
- 3D views of pattern and drilled holes
- View rock strata of multiple holes in 3D
- Drag drill to any position on pattern
- Zoom-out to view all drill patterns
- Show bench terrain and contours
- Surface features including operator warnings for ‘no entry’ or danger zones
- Mine and/or operators can customize screens to meet their specific requirements



Distributed Data

- Drill-to-Drill communication—operators know the status of all holes and drills
- Show multiple drill locations
- Real-time office updates of drill data
- 2 Way email messaging

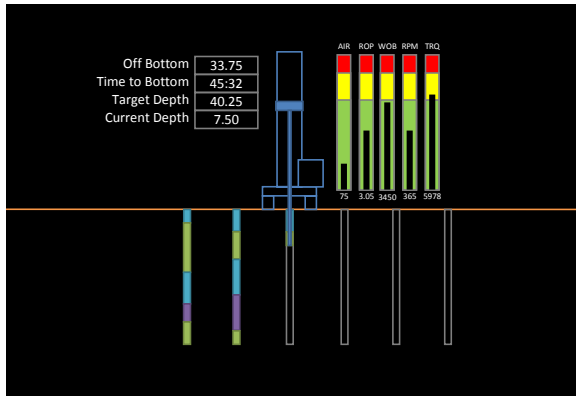


IMS Mobile

HPGPS DRILL GUIDANCE

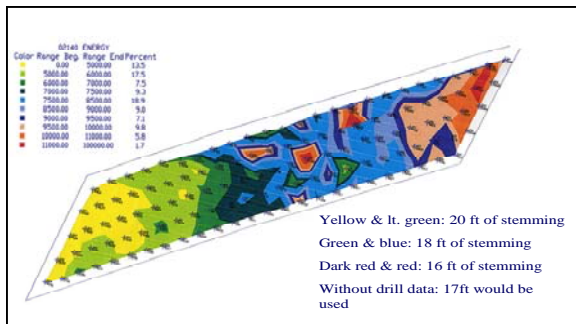
Augmented GPS

- Optional upgrade for guidance system
- Minimizes drill downtime due to GPS outages, drilling close to high walls, or deep pits
- Allows operator to continue drilling using the navigation screen



Blasting Index

- Upgrade allows for monitoring of pull-down, torque, RPM and air pressure, and the calculation of Specific Energy Index
- Real-time display of rock strata
- Integration of drill data with blast design software to improve blasts and reduce costs

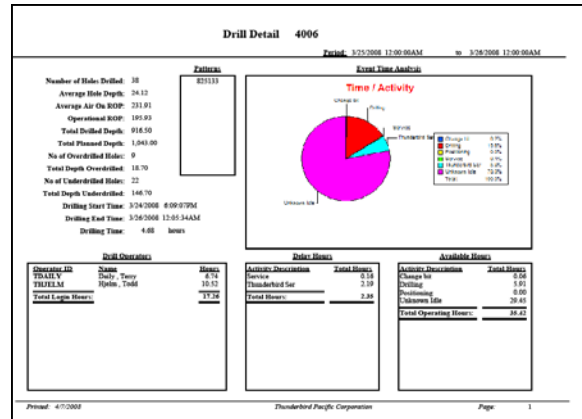


Hardware

- 12.1" XGA Operator Display
- Commercial, off-the-shelf components
- Built-in Wi-Fi radio
- Small footprint
- Simplified installation
- Ease of serviceability
- Open standards
- 2 weeks of on-board data storage

IMS Central

- Open architecture and scheme
- Full suite of drill reports including operator KPIs
- Microsoft SQL™ database
- Microsoft SQL Reporting Services™ used for report generation
- SQL queries easily done
- Easy to export data to other databases



Why IMS Drill Guidance

- Based on mining industry needs and requirements for enhanced drill productivity and augmented guidance capabilities
- Open system standards and architecture to permit the ready exchange of data and messages between existing 3rd parties and drill OEM systems
- Provides an affordable base monitoring and HPGPS guidance platform that can be incrementally upgraded to future higher functionality (i.e. automation, teleoperation, and autonomy) from 3rd party suppliers or drill OEMs
- Capable of being deployed on an extensive range of new or existing tri-cone or DTH blasthole drill makes, models and sizes

Thunderbird Mining Systems
2609 – 151st Place N.E.
Redmond, WA 98052-5522 USA
Phone: (425) 869-2727
Fax: (425) 869-2735
Email: mining@tbirdpac.com
Visit our web site:
www.tbirdpac.com