

***Providing Information to Manage  
Your Drilling and Blasting***



**DEI+Nav Systems Operating at a Gold Mine**

With the introduction of Thunderbird's DEI+Nav HPGPS Guidance system, a new standard for blasthole drill instrumentation has been established. The DEI+Nav has been designed from the ground up by a team that pioneered the development of the first drill monitoring and GPS navigation systems. This experience has allowed the team to design a lower priced system with many unique features not available in competitive systems that will provide its mining customers with a higher rate of return on their investment. Thunderbird has been supplying instrumentation to the surface mining industry for over 20 years. A full range of monitors and software solutions are available from Thunderbird to insure that each customer is provided the right product to meet your needs.

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***The DEI+Nav will reduce your drilling and blasting costs***

# DEI+Nav

## HPGPS DRILL GUIDANCE

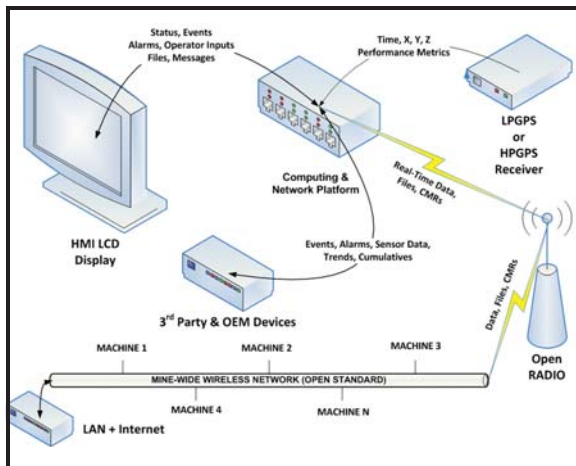
### DEI Systems

Thunderbird's DEI family of drilling monitoring products includes or will include:

- Basic drill monitoring
- HPGPS Drill Guidance
- Strata recognition using Specific Energy of Drilling algorithm
- PDA for viewing drill fleet status or emailing drills
- Supports remote tramming of drill with second display
- Health monitoring
- Interface to drill PLC systems
- Camera ready for added safety
- Rock Recognition
- Augmented GPS for more drilling time
- Backbone for remote and autonomous drilling

### Distributed Data

- Drill-to-Drill communication—know status of all holes
- Show multiple drill locations
- Real-time office updates of drill data
- Drill status available in the field
- 2 Way text messaging

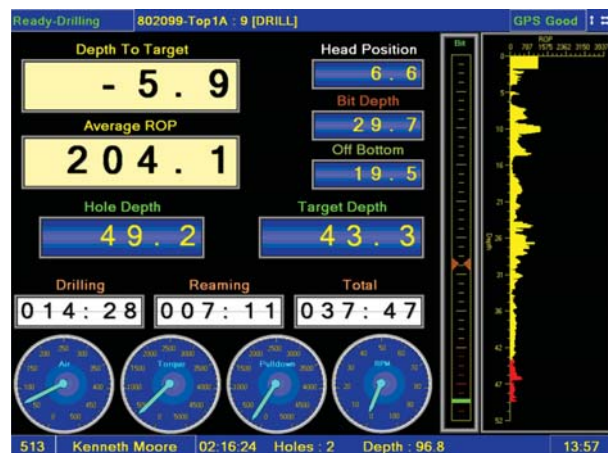


### Operator Display

- State-of-the art user interface
- 3D views of pattern and drilled holes
- View 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



### Navigation Screen with Drill Tramming

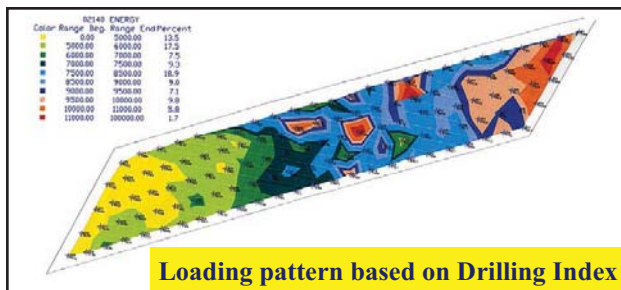
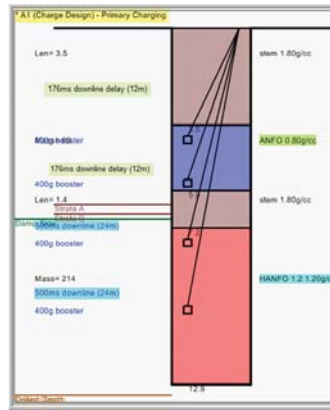


### Drilling Screen with Overdrilling Warning

### System Options:

#### Drilling Index

- Allows for monitoring of pull-down, torque, RPM and air pressure
- Real-time display of Drilling Index
- 3D view of drilled holes
- Integration of drill data with DBS blast design software to improve blasting and reduce costs



Loading pattern based on Drilling Index

#### Cameras

- Multiple fixed and/or Pan/Zoom/Tilt cameras
- Integrated into DEI+Nav Operator Display
- Improve safety and productivity



Drill fitted with Cameras and Radio Remote

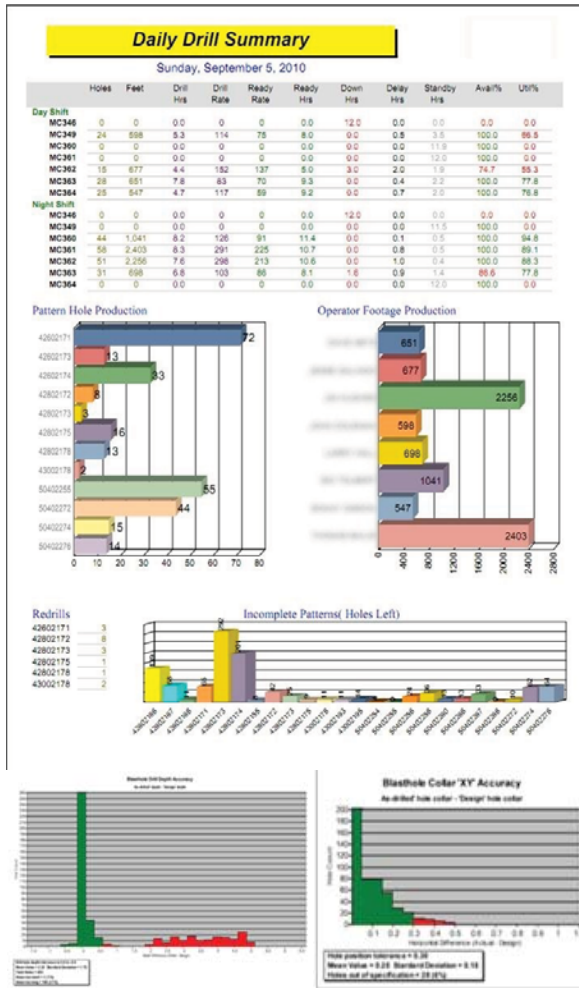
#### Radio Remote Control

- Third party supplied system
- Thunderbird provides 2nd display at control location which replicates on-board display
- Operate drill in unstable or unsafe locations



### Central Office System

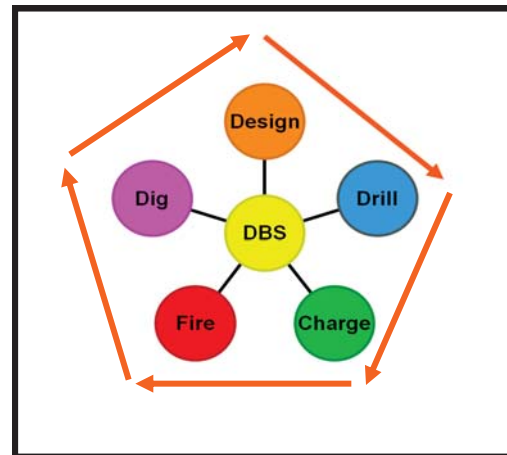
- Full suite of drill reports including operator KPIs
- Microsoft SQL database
- Microsoft SQL Reporting Services used for report generation
- SQL queries easily done
- Easy to export data to other databases
- Integration with DBS blasting software



### Why DEI+Nav Drill Guidance?

- Meets the customer needs because it has been designed by the most knowledgeable team in the industry
- Upgradeable from the DEI-X drill monitoring system
- Operator interfaces and features unmatched by any other system
- Enhanced, add-ons: PDA, Health Monitoring, Strata Recognition, Remote Trammig, Cameras
- Robust database
- Remote access via the internet
- Will provide the mine with a higher ROI because of the pricing and enhanced features

### DBS Drill & Blast Software



- Manage Topography and Surfaces
- Layout Blastholes
- Charge Blastholes
- Collect Drill and Blasthole Data
- Manage Drill and Blast Consumables
- Report on Drill and Blast Performance

*Fully Integrated and Available  
from Thunderbird*

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