I-BLAST 7.5

3D PHYSICS-BASED SIMULATOR FEATURES OVERVIEW FOR

UNDERGROUND & SURFACE

www.dna-blast.com
The I-Blast Software

In a Few Words

I-Blast is a Unique All Inclusive Blasting Information System allowing the collection, storing & automated interactive custom edition of field documents, and of engineering or blasting reports that outclass the industry standard.

CAN DO, in short:

- Define site-specific location and parameters such as explosives, geology, and more
- Design, analyze, simulate, keep record and document blast performances
- Integrate related data from other applications in use in the industry
- Store blast data in a structured data base, with specialist tools for analyzing, editing and reporting

Available in 3 versions:
- DESIGN EXPRESS
- PRO
- ADV

3 languages software: Français, English, Español

MINIMUM SYSTEM REQUIREMENTS FOR I-BLAST?

- Intel i5 or any newer CPU (recommended 3.30 GHz or faster),
- 4Go of system memory,
- 10Go of disk space,
- A dedicated graphic card

No needs for custom modules to be added to the system.

Whatever the version I-Blast is ALL INCLUSIVE.
The I-blast Version You Need

The essential, quick & affordable tools you'll need for designing & reporting efficiently Your blast.

The all-in-one product for smarts blasting engineers who wants to simulate vibration, fragmentation distribution & cast on a daily basis.

The blasting simulation software that includes the most advanced simulation & optimization modules for the whole blast.

GOOD REASONS TO CHOOSE I-BLAST SOFTWARE

Full Option
Efficiency
Accuracy
Physics
3D
The I-blast Version You Need

AVAILABLE IN

✓ UNLIMITED VALIDITY
✓ 1 LICENSE

✓ UNLIMITED VALIDITY
✓ 1 LICENSE
✓ 1 YEAR LICENSE
✓ 3 LICENSES
✓ PRIORITY SUPPORT

✓ UNLIMITED VALIDITY
✓ 1 LICENSE

GOOD REASONS TO CHOOSE I-BLAST SOFTWARE

Full Option  Efficiency  Accuracy  Physics  3D
## I-Blast Licenses

### Update & Support Policy

<table>
<thead>
<tr>
<th>Feature</th>
<th>1 License</th>
<th>3 Licenses</th>
<th>Unlimited Validity</th>
<th>Priority Support</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost of Updates</strong></td>
<td>FREE</td>
<td></td>
<td>40% of the license price</td>
<td></td>
</tr>
<tr>
<td><strong>Support by Email</strong></td>
<td>Non-priority</td>
<td></td>
<td></td>
<td>Priority Unlimited</td>
</tr>
<tr>
<td><strong>Support by Phone</strong></td>
<td>Not included</td>
<td></td>
<td></td>
<td>Installation, Set up &amp; Support</td>
</tr>
<tr>
<td><strong>Support &amp; Installation Pack</strong></td>
<td>Not included</td>
<td>(refer to Support Pack details)</td>
<td></td>
<td>Answer guaranteed within 48 hours (business days)</td>
</tr>
<tr>
<td><strong>Training Manual in Electronic Format</strong></td>
<td>Included (available in English, Spanish, French)</td>
<td>Included (available in English, Spanish, French)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### WHAT IS THE SUPPORT PACK? 

1. A remote** installation, set up and support including updates
2. A support contract including a quantity of Technical Support Units (TSU) to be converted in the twelve months, into one or a combination of the hereafter services:
   - 1 day of training for a maximum of 2 people to new functionalities in one our office or at client site*** = 7 TSUs
   - 1 hour of Remote** technical support service**** = 1 TSU
   - 1 question by email related to the handling or the functionalities of I-Blast = 1 TSU

** Remote support & services are operated through a client Team Viewer (set up on users computers during the I-Blast license installation process)
*** Whatever the training place chosen by the client, accommodation and transportation expenses are client’s costs
**** Technical support service do not cover engineering services and cannot include data processing of any kind

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VERSION 7.5

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I-Blast PRO, ADV

Tunnel Design Module

Automatic pattern and loading design

Various tunnel shape available

YOUR BENEFITS:

✓ Automatic design to save time when creating tunnel pattern
✓ Versatile range of parameters (explosives, diameter, strength,..) for full customization
✓ Export data to jumbo
I-Blast PRO, ADV

Underground Ring Blasting Design Module

YOUR BENEFITS:

 ✓ Automatic hole design to save time when creating ring blasting pattern
 ✓ Allows advanced vibration and damage simulations based on 3D model

Automatic pattern design around various tunnel shape

3D view of ring blasting design
I-Blast PRO, ADV

Define block size by a simple line between two points: Quick and easy

Scale is defined by the same process: 2 points line

YOUR BENEFITS:

✓ Easy, quick and efficient
✓ Allows to pinpoint boulders and fines at the same time
✓ Works whatever the quality of the image (light, contrast, …)
NEW

3D Explosives Energy Distribution available in a choice of 5 scalable resolutions

NEW!

Automatic simulation delivering 10 automatic horizontal cuts

NEW!

Timing Window based automatic simulations (AVAILABLE ONLY IN I-Blast ADV)

Option for the 3D Explosives Energy Distribution to take the timing sequence into account

NEW!

Custom vertical cuts simulation

Your choice of horizontal & vertical cuts can be displayed in 3D

YOUR BENEFITS:

✓ Custom & simple tool to spot critical zone inside and around the blast

✓ Improve:
  ▪ Your safety (flyrock risk)
  ▪ Your productivity (fragmentation, loading-hauling, energy cost, etc.)

✓ Self-explicit images for efficient

✓ Reporting

I-BLAST PRO, ADV

3D Explosives Energy Distribution

I-BLAST 7.5
3D PHYSICS-BASED SIMULATOR
PPV Simulation by scaled distance technique
Including Timing window and P wave Velocity

Select a timing window to calculate overlaps and predict PPV

Calculate overlaps where vibration matter using P wave velocity

YOUR BENEFITS:
- Improve vibration forecast
- Predict more accurately PPV depending on timing sequence
I-Blast DE, PRO, ADV

NEW

Automatic Cloud of Points Importation From Your Favorite Measuring Devices

NEW!

Importing from your favorite survey device: 3D profiles, lines or cloud of points

NEW!

3D critical profiles automatic definition from imported cloud of points

YOUR BENEFITS:

✓ Free face profile importation + Hole deviation data = real burden
✓ No risk of mismatching profiles and holes
✓ Save time when designing your blast
✓ Mitigate human error risks during this critical step (flyrock risk)
I-Blast ADV

NEW

3D Critical Profile from Cloud of Points

YOUR BENEFITS:

- Create automatic cross section of ground surface and visualize critical burden
- No risk of mismatching profiles (i.e. 2D profile not at the right place)
- Mitigate human error risks during this critical step (fly rock risk)
- Save time when designing your blast
- Visualize your blasting area in 3D for a better project management

3D Critical Profile shows you the minimum burden in front of the hole based on 3D face profile

Import large 3D clouds of points from drone or 3D laser scanner and create cross section

I-BLAST 7.5

3D PHYSICS-BASED SIMULATOR
I-Blast PRO, ADV

NEW Import 3D ground surface from Google map

**YOUR BENEFITS:**

- Visualize site environment
- Easily position buildings or houses for vibration simulation
- Map vibrations on a grid with Z level

Display Google image and select area to grid. Data are imported into UTM coordinates.

Imported cloud of point visualized in 3D windows.

Change system coordinate before importing points.
YOUR BENEFITS:

- Save time when designing a ramp
- Automatic hole depth set up for accurate drilling instruction

Automatic hole bottom adjustment when creating a ramp

Hole depth are automatically adjusted. Drilling instruction are clear.
I-Blast DE, PRO, ADV

NEW Hole Symbol Display

Your benefits:
- Print in B&W and save money
- Photocopy documents and key when highly readable

DATA MANAGEMENT

NEW!
Convert in ONE CLICK
Color Loading Hole into
Gray Scale Symbols

Each symbol represents a
different loading

I-BLAST 7.5
3D PHYSICS-BASED SIMULATOR
I-Blast DE, PRO, ADV

I-Blast Takes Care of Your Data & Preferences

Your Benefits:

- Save time at logging time
- Create your own working environment
- Comply easily with your corporate marketing policy
- No risk of loosing time and data through automatic real time back-up

Once you have been identified, all the preferences you set during your last session are automatically initiated:

- Language
- Metric or imperial system
- Color codes for reports
- Logos for the sites & reports
- By default working folder

Direct login through user automatic recognition = no needs for entering your login & pass at every connection

Simplified menus giving direct access to essential features

Feel safe at any time! No risk of losing time or data for any I-Blast version!

Whatever happens, you benefit from our real time automatic back-up functionality

DATA MANAGEMENT
I-Blast DE, PRO, ADV

Improved Preferences Management

The Options windows allows selecting your by default working folder

Save time! Once done, every exported files will be saved in the same place

YOUR BENEFITS:

✓ Save time in everyday operations
✓ Create your own working environment
✓ Share easily your design and simulation with other I-Blast users

I-BLAST 7.5
3D PHYSICS-BASED SIMULATOR
I-Blast DE, PRO, ADV

An Easier and Smoother Access to Your Simulation Results

YOUR BENEFITS:

- Every blast related simulation, calculation, measurements, data and documents in one place, conveniently organized
- Better client or corporate involvement about blasting achievements through blast rating functionality

3 zones has been defined to simulate vibrations
2 seismic recordings have been attached to that blast
A blast (flyrock) analysis has been performed
A rating scale (1 to 5 stars) is available to keep record of the shot result perception and/or of objectives achievements
Photos can be attached and will be automatically inserted on the Design Report recap page
The rotation features allows displaying the widest possible preview
Icons summarize the simulations done for the considered shot
A Blast Design (D), A Simulation Report (S) and a Blast Report (R) has been issued & attached for that blast
Fragmentation analysis (1 line per image)
Browse and attach easily your blast report to the selected blast
I-Blast DE, PRO, ADV
An Easier and Smoother Access to Your Simulation Results

The Objectives Tab allows a direct and visual access to the simulation done vs. objectives regarding fragmentation, muckpile shape, vibration and air blast.

A click on the question mark opens a tabbed folder where simulation results are conveniently gathered and organized.

YOUR BENEFITS:
✓ Save time by getting a direct and full access to the simulation results of a considered blast directly from the Blast Management windows.
I-Blast DE, PRO, ADV

Export Module: More possibility & Increased Flexibility

**YOUR BENEFITS:**

- Your I-Blast design is interoperable and can be processed by any software of the market thanks to the text and Excel format exportation features.
- Time saved! I-Blast keeps record of your last column choices to organize your data. The next exportation will be done along the set preferences.

Sharing all the details of your blast design in text format

Open an existing Excel file, create a new Excel file and/or select a sheet

The Export key opens the selected Excel sheet and organizes your data along the set format (column choices)
I-Blast DE, PRO, ADV

A New Direct Access to Every Blast Data & Documents

Left mouse button click on any hole of the shot displays:

- Shot name / reference
- Localisation / comment
- Number of holes
- Elevation (Z coordinate)
- Seismic recording place where PPV is maximum
- Maximum PPV recorded for this shot
- Related documents in the database (Blast design report, simulation report, attached blast report)
- Rating of the blast

Right mouse button click on any hole of the shot allows opening a PDF version of:

- The blast design
- The simulation report
- The (attached) blast report

YOUR BENEFITS:

✓ Get at hand all the information related to any of your blasts for an easy data mining and management
✓ Enjoy or give access to an handy dashboard gathering the job done on a given site
I-Blast PRO, ADV

Enjoy the 3D Displays of Blasts Multiselection!

TIP! Number of selected blasts is displayed here

Multi-selection of the blasts you want to represent simultaneously in 2D

TIP! You can display the holes with or without their respective loading

Your multi-selection simultaneously in 3D!

YOUR BENEFITS:

✓ Get access to a unique perspective on the job done in a given site
✓ Illustrate your reports with breathtaking attractive displays
I-Blast DE, PRO, ADV
UG / Tunnel Full Compatibility

**YOUR BENEFITS:**

- No need for specific module or license: the same software allows addressing indifferently surface and underground cases with dedicated only when necessary
- Switch smoothly from UG to surface without minimum additional training

**CAD functionalities, analysis, simulation and optimization features apply equally to surface (mine / quarry, civil works), underground and tunneling applications**

**Dedicated menu and functionalities to take into account underground mining, tunnel & shaft specifics**

**When possible, menus and ergonomics are common to UG and surface design, analysis, simulation and optimization**
I-Blast DE, PRO, ADV
Make I-Blast CAD Functionalities Always More Interoperable

Whatever the survey system your are presently using (GEMCOM, MINESITE, or any others) to survey your holes, I-Blast offer now the ability to import easily your hole coordinates.

<table>
<thead>
<tr>
<th>HOLE COORDINATES YOU GET</th>
<th>CAN YOU IMPORT WITH I-BLAST?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface + Depth</td>
<td>YES</td>
</tr>
<tr>
<td>Surface + Bottom</td>
<td>YES</td>
</tr>
<tr>
<td>Surface + Azimuth (angle)</td>
<td>YES</td>
</tr>
<tr>
<td>Bottom + Depth</td>
<td>YES</td>
</tr>
</tbody>
</table>

Very useful when your reference is the targeted floor elevation.

YOUR BENEFITS:

- No change in your working habits
- Compatible with industry survey standards and way of thinking (quarry or mine, surface or UG)
I-Blast DE, PRO, ADV

Make I-Blast CAD Functionalities Always More Flexible

YOUR BENEFITS:

- Rapid update of design for last minute change and greater productivity
- Attached hole loading and characteristics save you time and efforts
**I-Blast DE, PRO, ADV**

Make I-Blast CAD Functionalities Always More Flexible

1. **Click** on the precise x,y point of destination for the selected group of hole. Precise x, y coordinate of the point you selected are displayed at the bottom of the floating window.

2. **Click** on the hole you want to locate exactly in the location selected at stage 1.

**Result:** the group of selected hole move as is using the selected point as the new location for the selected hole.

**Your Benefits:**

- Update rapidly and accurately your design to take into account last minute changes in shot configuration
- Adapt easily theoretical design to reality (drilling issue, survey error, etc.)
I-Blast DE, PRO, ADV

Make I-Blast CAD Functionalities Always More Flexible

YOUR BENEFITS:

✓ Perform rapidly complex design by importing already available data about group of holes
✓ Mitigate human error in holes selections for better safety

Importing lines easily eg. for hole selection purpose
I-Blast DE, PRO, ADV

Make I-Blast CAD Functionalities Always More Flexible

**YOUR BENEFITS:**

- Prevent you to forget checking the critical burden, including for angled holes
- Mitigate the flyrock risk

**DIRECT READABILITY** of bench burden

The grid angle follows the hole angle

Tickable boxes to display the minimum and maximum hole-face distance. ‘Angle with’ box measure this distance taking the hole angle into account

Bench line automatic calculation and drawing

The hole angle is now displayed together with the depth of the considered hole by pressing the Z icon
I-Blast DE, PRO, ADV

Importing Profiles Automatically From Your Favorite Measuring Devices

1. Select the considered holes in the same order you scanned their profile

2. Browse the output file of your favorite:
   - face profiler and/or
   - deviation measurement device eg. Boretrack data

3. Tick the ‘set all’ box and import: each profile are automatically assigned to their respective hole.

YOUR BENEFITS:

- Free face profile importation + Hole deviation data = real burden
- No risk of mismatching profiles and holes
- Save time when designing your blast
- Mitigate human error risks during this critical step (flyrock risk)
I-Blast DE, PRO, ADV

Intuitive correction of imported profiles

YOUR BENEFITS:
- Take real life constraints of mines and quarries into consideration (e.g., not 100% evacuated toe)
- Get the most of your field measurements, whatever the actual field conditions
I-Blast DE, PRO, ADV

The Lines Creation Features

**YOUR BENEFITS:**

- More flexibility in representing shots environment
- Comply to your way of working

A complete set of editing tools allowing to hand draw, name, modify, delete any points or lines around your blast.

Double-click to terminate a line, select a point or manage your lines directly from the chart.
I-Blast DE, PRO, ADV

Explosives Templates: More possibility & Increased Flexibility

NEW!
Access in one click to all your explosives templates through a redesigned & resizable windows. Because an explosive is not specific to a site

NEW!
You can export explosives templates created for a given site under Excel format & More

NEW!
Sorting functionality of explosives by manufacturer / dealer in explosives templates

YOUR BENEFITS:

✓ Save time by not recreating existing explosives templates
✓ Share your templates in a click with other I-Blast users
✓ Share your templates with anybody thanks to MS Excel full compatibility
I-Blast DE, PRO, ADV
Explosives Templates: More possibility & Increased Flexibility

For a smoother collaboration between I-Blast users, you can now export and import explosives templates created for a given site under .dna format (as easy as you can share blast design files)

YOUR BENEFITS:
- Enhanced easier collaborative modes between I-Blast users (e.g. export/import, email)
NEW!

Loading from bottom to top in units, length or weight (metric or imperial) based as you would perform it on field and based on the exact quality or formula of the products you want to use.

Strength (g/m) of detonating cord is a parameter.

Booster weight is now a parameter.

No limitation in term of combination, complexity, number of charge, of decks, etc.

YOUR BENEFITS:
- Time saved and shorter training following blaster’s way of working
- Simulation gets even closer to real outputs
- More accurate total quantity of explosives in the report

I-Blast DE, PRO, ADV

Loading Interface: Real Life Loading is at Your Reach
I-Blast DE, PRO, ADV

Loading Interface: Real Life Loading is at Your Reach

**YOUR BENEFITS:**

- More accurate loading = higher safety (stemming) and productivity
- Real life case by case tuning of your modeling for more reliable simulation
I-Blast ADV
Smart Automatic Importation of Loading and Timing

YOUR BENEFITS:
- No change in your working habits
- Full interoperability e.g. with EDD manufacturer software tools

No limitation of any kind (type of charge, number of decks, etc.)

Select your loading parameters if not in the Excel spreadsheet:
- Explosives type from the database
- Deck and final stemming

You get your loading done on Excel? No worry, just import your holes and/or loading and/or timing directly into I-Blast.
I-Blast ADV

Smart Automatic Importation of Loading and Timing

NEW!

More flexible importation of blasting configuration from Excel including holes location only, loading of a portion of holes, etc.

Smart importation with automatic adjustment and explicit warnings about inconsistencies between hole configuration and imported loading

Automatic checking and statistics about:
- Loading holes vs. selected holes
- Explosives density adjustment (up to a critical level of 1.4)
- Depth adjustment
- Missing holes, charges or timing between Excel chart and I-Blast design, if any

Check your imported loading using the Inspector

YOUR BENEFITS:
- Excellent match to large mines way of working
- Safety rules preventing potential human errors and/or environmental norm violation
I-Blast ADV

Smart Automatic Loading & Timing Function of Objectives

NEW!

1. Selecting explosives

2. Selecting your hole configuration including:
   ✓ Deck stemming length
   ✓ Final stemming length
   ✓ Inter deck timing
   ✓ Bottom/top detonators
   ✓ Booster

3. Selecting your adjustment options vs. hole depth:
   ✓ Deck stemming length adjustment or
   ✓ Identical charges forced parameter

Load automatically your holes function of your selected parameters and objectives

YOUR BENEFITS:
✓ Saved time thanks to this 3 seconds process to smartly charge your holes
✓ Smart, automatic but highly flexible to match with real life configuration
Non Electric Detonators Specifics Now Taken Into Account

- Non electric detonators specific green color code in loading templates to underline the specifics of nonel consideration
- Entered value for the non electric detonators (here 17ms)
- Automatically adjusted timing based on down-the-hole tube VoD (here 23ms)
- Non electric detonators VoD is now a parameter to be entered at loading time to take the detonation travel time in the down-the-hole tube. Down-the-hole timing is automatically update based on the VoD value
- Down hole and surface non electric standard deviation are parameters to be entered in timing sequence windows
- Monte Carlo simulations (1 or 50x) can be run to simulate the standard deviation impact on scattering and the out of sequence potential quantity

YOUR BENEFITS:
- Even more trustable simulations for non electric users through real life consideration of non electric detonators specifics
- Safer design by taking into account e.g. scattering effect, out of sequence
I-Blast DE, PRO, ADV

Hole Positioning vs. 3D Profiles

YOUR BENEFITS:

✓ Better control on cast and fragmentation through the positioning of holes vs. 3D real face profile
✓ Transfer x, y, z resulting coordinates to the driller for an accurate implementation of your prescriptions
I-Blast DE, PRO, ADV

The New Lines Management Features

Featuring imported lines together with google map or mine plan background

Displaying the defined zones at their respective altitude, location and size

Representing the loading and the wiring in 3D

YOUR BENEFITS:

✓ Interoperability with your favorite survey device
✓ Real life featuring of blast configuration and environment for better and safer decision
✓ Report illustration
I-Blast DE, PRO, ADV

UG / Tunnel 3D Compatibility: The More Complex The Better!

YOUR BENEFITS:

✓ Especially helpful for an easier perception and analysis of complex to very complex surface and/or underground blasting operations

✓ Clarifying interactive 3D display for impacting internal/external communication

3D functionalities including loading, wave propagation, zones (amongst others) fully apply to any surface, UG or tunneling
I-Blast DE, PRO, ADV

Zones: New Features & 3D Displays

YOUR BENEFITS:

✓ More realistic modeling for trustworthy simulations
✓ Get easily clarifying self explicit displays to illustrate your reports
✓ Time saved! No need to recreate zones you have already on Excel thanks to I-Blast new MS full compatibility
I-Blast DE, PRO, ADV

Get Direct Operational Information From Your Face Profiles

GLOBAL BENEFITS OF THE INSPECTOR

VISUALIZE HOLE CHARACTERISTICS IN A CLICK

- LOADING full details
- HOLE position and characteristics
- GEOLOGY + K &Alpha around the hole
- BENCH PROFILE if it is a free face hole
- SEISMIC TRACE if it is a signature hole

Get your POWDER FACTOR vs. Bench burden in one click!

YOUR BENEFITS:

- Direct visualization of areas, potential cause of flyrocks
- Intuitive decision aid tool to reach your fragmentation objectives

Intuitive self-explicit color code
I-Blast PRO, ADV

Automatic calculation of rock strength from drilling logs

**NEW!**
Select the considered holes in the same they were drilled and assign to each hole in one click its respective drilling log

**NEW!**
A choice of 2 Compound Parameters and 4 drilling parameters

**NEW!**
Tick the box to display the resulting rock strength index besides the holes for a tailored loading

**NEW!**
Add the drilling log compound parameter to your report for a documented loading

**YOUR BENEFITS:**
- Get a qualitative rock strength index around each and every hole, from your drill logs
- Reach the optimum loading that balance productivity and cost
I-Blast DE, PRO, ADV

2D Explosives Energy Distribution

NEW!

2D Explosives Energy Distribution available in a choice of 5 scalable resolutions

YOUR BENEFITS:

✓ Your fastest way to get an overview of the impact of your loading (and sequence, if «Timing option» is selected) inside & around the blast

✓ Simple analysis tool delivering immediately readable outputs

✓ Self-explicit images for efficient reporting

NEW!

Option for the 2D Explosives Energy Distribution to take the timing sequence into account

NEW!

Color scale representing 2D Explosives Energy Distribution vs time

NEW!

Displaying 2D Explosives Energy Distribution calculation result
I-Blast PRO, ADV
A More Performing Photogrammetric Analysis System

For a finer contouring of fragments I-Blast automatically:
• Converts in grey scale to achieve a maximum contrast
• Adjusts the resulting contrast from the standard deviation of lightness

For a faster analysis I-Blast automatically:
Resize the uploaded photo

3D graph featuring the contrast optimization automatically performed by I-Blast

For each image are saved:
• The analyzed size distribution
• The selected and automatically set parameters
• Display of image name

Concatenated Analysis of the whole set of images for a more representative size distribution estimation

Your benefits:
✓ Check even more rapidly your fragmentation outputs thanks to this included module
✓ Ground your reports comparing field results and simulations

<table>
<thead>
<tr>
<th>BEFORE</th>
<th>I-BLAST 6.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>160 seconds</td>
<td>20 seconds</td>
</tr>
</tbody>
</table>

Average analysis duration for a 500ko photo
The burning front phenomenon is featured (green arrows) when displaying the sequence (colored stars being the detonating holes).

3D viewer offers another way to perceive the burning front:
- Surface tube switch from blue to yellow after the wave propagated
- Down-the-hole detonators switch from red to yellow when detonating

YOUR BENEFITS:
- Mitigate surface or tube cut-offs risks that lead to safety issues
- More informed decision based on non electric detonators inherent inaccuracy and specifics
I-Blast PRO, ADV

Charge per delay Module Smarter Ergonomics

YOUR BENEFITS:

✓ Save time especially for site where a lot of blasts have been entered in your database
✓ Prevent human error when selecting useful recordings. For meaningful regression law.

NEW!
Delete function of outliers directly from the attenuation law graph

Save your selection of events that gives you the best correlation and attached it to your zone.

TIP! Floating Graph features allows you to conveniently display your regression law on the same screen

No need to make your selection again: Just load it and add new recordings, if any.
I-Blast PRO, ADV
Charge per delay Module Smarter Ergonomics

Hover your mouse over the event and get detailed information including:
• Seismic recording place where PPV is maximum
• Maximum PPV recorded for this shot

Each color corresponds to a specific monitoring/recording location

A confidence interval can be set to tune the regression law outcome

Improved regression law displays allowing a differentiation between the signal source:
• Dots for signature holes
• Squares for full blasts

A convenient field abacus helps you to determine your charge per delay vs. distance

YOUR BENEFITS:
✓ Easier and Faster analysis and keep up with the production process
✓ Deliver intuitive and accurate decision tools to field operators
I-Blast ADV

Charge per delay Module Smarter Ergonomics

YOUR BENEFITS:

✓ Get automatically $K$ & alpha for a zone at a given distance &/or period of time
✓ Design more rapidly a compliant sequence according to your vibration constraints

Sort your recordings by distance to the blast and/or dates

Automatically selection of the seismic events from your criteria (date &/or distance)

Automatic calculation your $K$ & alpha for the considered zone
I-Blast PRO, ADV
Charge per delay Module Smarter Ergonomics

YOUR BENEFITS:
- Save time by getting a serie of k & alpha scenarios already selected and ready to apply
- Go deeper in the analysis by affecting easily different K& alpha to different zones of your site

NEW!
Saved as scenarios your selections of seismic events for charge per delay calculation (k & alpha)

NEW!
Affect directly any of your k & alpha scenarios to a considered zone
I-Blast PRO, ADV

Charge per Delay Module: Far Field Radius

How to?
1. Select a zone and activate it
2. Use the Distance tool to draw concentric circles around one zone covering the desired areas where charge per delay matters
3. Press «Charge Per Delay Radius» in Far Field Simulation Menu

YOUR BENEFITS:
- Forecast automatically your charge per delay around selected zones
- Design successful blast faster and achieve vibration constraints

Maximum charge per delay in a scaled color coded circles ranging from blue to red are displayed function of active zones K and alpha

If 2 or more zone have been activated, I-Blast will automatically draw the same concentric circles around each zones for you to analyze the intersection at blast level
I-Blast PRO, ADV
Seismic Module Smarter Ergonomics & Accessibility

BEFORE

AFTER

Resizable windows for a better signal reading & analysis

Faster and more accurate analysis thanks to this red circle around the maximum amplitude of each channel

Tickable boxes for selective importation of signal channels.
Benefit: No more unwanted signal disturbing the analysis

YOUR BENEFIT:
- Faster and more accurate analysis
- Clear automatic emphasis on critical information (e.g. max PPV)
I-Blast PRO, ADV
Air Blast Scaled Distance Model

Air blast level is now displayed in the management board.

Your selection of relevant events can be saved and attached to a zone.

Air blast management is now fully aligned with the vibration records management including:
- Automatic correlation coefficient calculation ($r^2_{\text{Air}}$)
- Attenuation law (with floating graph features)

**YOUR BENEFITS:**
- Saved time thanks to an easier selection and management of relevant events
- Comply with environmental regulations, manage community relationships
I-Blast ADV

Automatic P wave Calculation from Combined Seismic & Air Blast

YOUR BENEFITS:

- A fast and performing way to automatically calculate the P wave velocity
- Deeper and richer analysis of air blast signals for better and safer blast outputs

ANALYSIS

1. Set the air temperature
2. Click on beginning of signal on any LTV channels
3. Click on beginning of S channel signal
4. Get automatically the p wave velocity and arrival time

The complete set of filtering functionalities available for seismic records now also apply to air blast records
I-Blast ADV

Smart Automatic Loading & Timing Function of Objectives

Decide your automatic loading options:
✓ Function of a targeted charge per delay
✓ A PPV limit

YOUR BENEFITS:
✓ Comply easily but accurately with your charge per delay or PPV limit constraints
✓ Compare loading and timing configurations in a click

Note the difference in hole #302 automatic loading, respectively function of a 100kg (left) and 60kg (right) charge per delay objective

Automatic design of the charges takes into account each hole position and distance vs. the selected zone, where a PPV limit is required

Note the difference in loading between hole 302 (@ 118.10 m from zone H) and 32 (@ 198.50 m from zone H), for a 25mm/s PPV limit
I-Blast ADV

Automatic Cast Calculation

NEW!

Cast and muckpile shape simulation for several rows including real face profile

Full and intuitive blast geometry and hole parameters definition including geology and real bench profile

EXAMPLE: 16 vs. 58ms Inter Row Delay

IRD=16ms

IRD=58ms

YOUR BENEFITS:

✓ Get instantaneously the muckpile shape and cast minimum extension for a given field configuration
✓ Easy comparison of timing scenarios as regard muckpile shape (hauling & loading)
I-Blast PRO, ADV

Air Blast Simulation for 1 Hole, Function of Free Face Direction

- **Your Benefits:**
  - Trustworthy simulation taking into free face orientation (not a simple radius)

---

**Average level of air blast (here in decibels) taking the free face direction and the loading into consideration**

**Definition of the free face direction**

**Distance from the blast where air blast is concern**

**Level of air blast in each direction and for the considered distance from the blast (here in decibels)**

**Scale of color ranging from yellow to red, function of the average air blast level**
I-Blast ADV

Air Blast Simulation at Zone Level for the Whole Blast

1. Set your parameters for a finer air blast simulation (temperature, wind strength and direction)

2. Display the Air blast interferences until they pass through the analyzed zone

3. A graph displays in real time the air blast level at the selected zone

YOUR BENEFITS:

- Better anticipation and control on blast related environmental nuisances
- Simulate the impact of weather air blast propagation
I-Blast ADV

Automatic Cast Calculation & 3D Muckpile Shape Modeling

YOUR BENEFITS:

✓ Get the cast minimum extension of the whole blast for adequate clearance
✓ Save time! A single calculation automatically favors 2 critical purposes: cast calculation & 3D muckpile shape
I-Blast PRO, ADV

Enjoy the Benefits of the 3D Interactive Display

YOUR BENEFITS:

- Easier analysis on complex configuration thanks to 3D interactive features
- Convincing enlighten displays for better informed decision
I-Blast ADV

Signature Hole Optimization: Unlocked Possibilities!

I-Blast ADV Signature Hole Optimization features allows now a linear superposition in:
✓ Time domain
✓ Frequency domain

Deck signature analysis is now available!

Full filtering features

I-Blast ADV Signature Hole Optimization features allows now a linear superposition in:
✓ Time domain
✓ Frequency domain

You can now perform your optimization whatever if your Signature Hole gets one or several decks, if you want to process one or several single hole(s) or the type of configuration (far field / near field)

Your Benefits:
✓ More flexibility in selecting your signature holes
✓ Deeper and richer optimization process

<table>
<thead>
<tr>
<th></th>
<th>1 Signature Hole</th>
<th>Multiple Signature Hole</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAR FIELD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Deck</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Decks</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>NEAR FIELD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Deck</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Decks</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>
I-Blast ADV

Calculation Times Have Also Been Optimized!

For any CPU demanding calculation you get in real time:
✓ The percentage of completion of the calculation in a bargraph
✓ The estimated time to complete the calculation taking into account the characteristics of your computer

Each CPU demanding calculation can be performed either using the multicore potential of your computer or be done with a single core (longer process)

By default parameter is set to multicore for any simulation with a sampling rate over 1024

YOUR BENEFITS:
✓ Faster simulation means more productivity for you
✓ Being informed, you can better organize your job

I-BLAST 7.5
3D PHYSICS-BASED SIMULATOR
I-Blast ADV

Signature Hole Optimization: I-Blast Send You an Email!

**YOUR BENEFITS:**
- No need to wait until the end of calculation
- Get your results automatically summarized and transferable, including to I-Blast non users

Attached files include:
- Timing optimization PPV
- Timing optimization Frequency
- Minimum Inter Hole Domain

Email includes:
- Signature hole location
- Alpha factor
- Vp
- Type of calculation (time or frequency domain)
- Deck signature or not
- Filtering performed
I-Blast ADV

From Signature Hole Optimization to Design

YOUR BENEFITS:

✓ Analyze, optimize and design with a unique integrated software
✓ No time lost in transferring or uploading data from a module to another

Automatic calculation of the optimized inter hole delay

Direct application of calculated best inter hole delay to your sequence (here: 13ms)
I-Blast ADV

Signature Hole Optimization: 3D Results

YOUR BENEFITS:

✓ Find automatically the best sequence that will match to your vibration objectives
✓ Get 3D graph for richer analysis and impressive illustration of your report

A 3D real time graph is now available for an easier and more accurate analysis of:

✓ Vp,
✓ Frequency or
✓ Optimized inter hole delay

PPV or frequency simulation for the selected Inter Row Delay and the range of Inter Hole Delay
I-Blast DE, PRO, ADV

Reporting Your Design, Your Simulation & Your Results

**YOUR BENEFITS:**

- Full reporting capability including custom monitoring results for better compliance
- Editing functionalities for greater flexibility and real life way of working!

**BLAST DESIGN REPORT**

- Automatically compile, customize, edit, save and print your comprehensive & complaint reports

**SIMULATION REPORT**

**RESULTS REPORT**

- Upload your logo & select your color code to provide unique corporate documentation

**NEW!**

The pdf edit toolbox and paint-brush style features allow pinpointing and commenting in a second the critical issues on any page of the automatic reports
I-Blast DE, PRO, ADV

Reporting Your Blast Has Never Been so Easy, Fast & Flexible

NEW!
5 options to illustrate your blast design report: Default site image, Before blast picture, 3D view of the design, Site logo or map background

TIP! Just click here to add the 3D view to the front page illustration options

YOUR BENEFITS:
✓ There is always a reporting style that fits to your requirements!
✓ Appealing reporting increase your credibility and are statistically more likely read
I-Blast DE, PRO, ADV

Reporting Your Blast Has Never Been so Easy, Fast & Flexible

**NEW!**
A redesign interface and an extended content for the Blast Design report.

**NEW!**
Once created a pdf page is save in the data base and can be reuse anytime for printing of compiling purpose

**NEW!**
Amongst others: a blast location page is now available

**YOUR BENEFITS:**
- Increased safety and efficiency through flexible fully customizable field documents and simulation reporting
- Save time by creating once each page and reuse them anytime afterwards
- Meet easily your reporting requirements, ground & illustrate your technical options
- Share easily and safely your data & simulation in PDF format
I-Blast DE, PRO, ADV

Reporting Your Blast Has Never Been so Easy, Fast & Flexible

NEW!

Redesign

Explosives List section which now also includes detonator number (for electric detonator only) and quantity of accessories in the blast design, sorted by reference number (electric detonator only) and/or length of cable.

Customized automatic conversion of delay in detonator numbers

YOUR BENEFITS:

- Contribute efficiently to your references management at inventory level
- The more detailed the explosives and blasting accessories quantities are, the better and safer
I-Blast DE, PRO, ADV
Reporting Your Blast Has Never Been so Easy, Fast & Flexible

**NEW!**
Drilling audit output now in blast design report

**NEW!**
Enter your time window for a perfectly customized report

**NEW!**
Cumulative holes / overlap analysis now in blast design report

**YOUR BENEFITS:**
- A even more complete reporting capability now covering the post design audits
- Increase your credibility by reporting on the audits that ground your design options
I-Blast DE, PRO, ADV

Reporting Your Blast Has Never Been so Easy, Fast & Flexible

NEW!

Weather forecast, blast mats implementation and Blaster’s name custom fields now available on top of Comment page. This information will be featured:
- in the new recap page and
- in the new “Info” tab of the Blast Management Screen

YOUR BENEFITS:

- Additional critical informations are now featured on the recap page for an higher readability and accountability
- Make Safe Choices and Informed Decisions from gathered and clearly stated facts and figures
I-Blast DE, PRO, ADV

Improved Blast Design Recap

**NEW!**
Better match to blaster’s way of working. Get instantaneously:
- Type of blast
- Type of Initiation
- Hole survey source
- Weather forecast
- Mats implementation
- Blaster’s name

**NEW!**
Greater readability of loading prescriptions thanks to larger windows and automatic fit to width features

**NEW!**
Featuring more clearly only the critical information

**NEW!**
Add your comments thanks to the edit features of the report functionalities

**YOUR BENEFITS:**
- Clear straightforward field documents for easier and safer implementation
I-Blast DE, PRO, ADV

Reporting Your Blast Has Never Been so Easy, Fast & Flexible

YOUR BENEFITS:

- Keep record of the compiled reports automatically organized in a structured database
- Save time and deliver customized, straightforward error free sheets to field operators for safe implementation

Save automatically in the database the last compiled Blast Design (D) and Simulation Report (S)
I-Blast DE, PRO, ADV

Reporting Your Blast Has Never Been so Easy, Fast & Flexible

NEW!
Monitoring / results report now available including seismic events, peak level and considered zone

YOUR BENEFITS:
✓ Reporting now covers the design, the simulation and the result for full corporate compliance and accountability
I-Blast PRO, ADV
An Easier and Smoother Access to Your Simulation Results

Get in one click a graph representing your PPV level at each zone.

TIP!
The displayed text is too small, not readable enough? I-Blast make your life easy: just adjust it as you like using the grey arrows.

YOUR BENEFITS:

✓ A convenient way to check your recordings and simulation
✓ Another option to illustrate your reports
I-Blast PRO, ADV

Reporting The Processing of Drilling Logs

NEW!
The drilling log, if any, are now displayed besides the loading plan of the considered hole.

As a rule of thumb, the more the log curve goes to the right, the harder the rock.

YOUR BENEFITS:

✓ Clear straightforward field documents for easier and safer implementation
✓ Justify your loading choices with an additional tangible and self-explicit argument
## MAIN FEATURES

<table>
<thead>
<tr>
<th>DATABASE &amp; ERGONOMICS</th>
<th>DE</th>
<th>PRO</th>
<th>ADV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic preferences back-up (including language, unit system, color code, logos, etc.)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Direct login through user automatic recognition</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Metric and imperial units compatible</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>French, English and Spanish languages</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Direct and visual access to simulation done vs. objectives incl. Frag., muckpile shape, vibration &amp; air blast</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Simplified menus giving direct access to essential features</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Blast rating scale functionality</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>By default working folder selection</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Bulk explosives templates incl. density, price, supplier, VoD @ diameter, ideal &amp; measured VoD, critical diam.</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Packaged explosives templates incl. diam., length, weight, density, price, supplier, VoD, critical diam, etc.</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Sorting functionality of explosives by manufacturer / dealer in explosives templates</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Geology templates incl. density, Pwave velocity, Poisson ratio, K &amp; alpha, tensi. &amp; compr. strength, Young Mod.</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Loading templates for any hole diameter and depth</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Automatic adjustable charges with depth</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Blaster’s way of loading from bottom to top</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Adjustable cartridge height to take settling into account</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Detonating cord features as input (g/m)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Decked charge including air deck, plug, intermediate stemming</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Non electric distinctive color and in-hole tube VoD automatic calculation function of hole depth</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Top/bottom booster and detonator</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Adjustable booster weight</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Final stemming functionality</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Sand / gravel stemming quality alternative</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Direct access to any loading templates, disregarding the Site for which they had been created</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Image attachment functionality</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Pdf attachment functionality</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Rotation features for optimized display at management screen level</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Email sharing functionality for I-Blast files</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Exportation / importation module for I-Blast files including MS compatibility</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Explosives templates importation/exportation, Excel compatibility, sharing via email</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Excel and Text format importation/exportation of blast design</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>
## MAIN FEATURES

### DATABASE & ERGONOMICS

<table>
<thead>
<tr>
<th>Feature</th>
<th>DE</th>
<th>PRO</th>
<th>ADV</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D mutiselection of blasts</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Blast configuration, seismic recording, blast rating display on mouse hover from 2D multiselection</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Direct access to created and attached reports from 2D multiselection</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3D mutiselection of blasts</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

### DESIGN MODULE (CAD)

<table>
<thead>
<tr>
<th>Feature</th>
<th>DE</th>
<th>PRO</th>
<th>ADV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holes creation (round, staggered, odd rows)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Move holes to xyz coordinates, from fix/custom step in 4 directions &amp; custom angle</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Move graphically a group of holes in a click</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Expand or reduce the pattern of a group of holes (percentage)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Holes creation and importation (xyz or GPS)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Intuitive copy-paste of holes with their characteristics (loading, timing...)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Automatic importation of hole deviation data (e.g. Boretrack data)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Delete a selection of hole, empty holes or delete loading without deleting the hole</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dedicated menu and functionalities for underground and tunnel</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Change charac. of holes s including depth, coordinates, diameter, free face burden or direction, timing &amp; more</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Polylines importation for holes selection purpose</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Set deck timing (top and/or bottom detonators) along an absolute, constant or offset timing</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Loading module with created or default explosives</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Timing module for EDD, non electric and electric detonators</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Editing tools to hand draw, name, modify, delete any points or lines</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Measuring device in metric and imperial</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Zones importation / exportation from / to Excel</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2D / 3D display of zones</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Custom color for 3D displayed zones</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2D / 3D burning front display</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3D display of holes with or without respective loading and wiring</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Custom color background for 3D display</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Scalable size of 3D displayed holes and wiring representation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Automatic rotation of 3D display (speed and trajectory)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Non electric VoD, down hole and surface standard deviation consideration</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
# I-Blast 7

## MAIN FEATURES

### DESIGN MODULE (CAD)

<table>
<thead>
<tr>
<th>Feature</th>
<th>DE</th>
<th>PRO</th>
<th>ADV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic timing adjustment based on down-the-hole tube VoD</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2D/3D bench profile, cloud of points, lines import (.csv / .txt format, automatic with MDL, TruePulse &amp; TEPEX)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Bench line automatic calculation and drawing</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>xyz hole positioning vs. 3D profiles</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Google Earth / Map, imported images / plan as a background</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Seismic / air blast event importation (automatic with NOMIS, IDETEC, other .csv)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Semi-automatic timing design (for EDD only, ms/m of bench)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Powder factor vs. bench burden</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Waves propagation display in 3D for every charges (deck)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Automatic importation of profiles for a selection of holes or the whole blast</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Correction of imported profiles (non completed muckiple evacuation at toe level)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3D real time muckpile shape simulation</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic cloud of points importation from Google Map</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3D critical profiles automatic definition from imported cloud of points</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Automatic timing design (for EDD only, ms/m of bench)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monte Carlo based standard deviation sim. for non electric initiators (impact on scattering &amp; out of sequence)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3D simultaneous display of blasts (including loading, timing, ground level, bench profile and zones)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexible importation of blasting config. from Excel (holes only, adding missing one, loading only,...)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Automatic loading from explosives type, deck characteristics and final stemming definition</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic adjustment &amp; warnings (explosives density, depth, missing holes, etc.)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic loading function of a targeted charge per delay</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic loading function of a PPV limit</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic timing (for EDD, based on charge per delay and PPV limit objectives)</td>
<td>✓</td>
<td></td>
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</table>

### ANALYSIS CAPABILITIES

<table>
<thead>
<tr>
<th>Feature</th>
<th>DE</th>
<th>PRO</th>
<th>ADV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interferences and overlap sequence analysis</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Initiation sequence player with waves interferences &amp; sound</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>2D/3D burning front simulation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Surface, underground and tunnel compatible set of analysis</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Timing based Charge per delay calculation</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seismic scaled distance model (Charge per Delay)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</table>
## MAIN FEATURES

<table>
<thead>
<tr>
<th>ANALYSIS CAPABILITIES</th>
<th>DE</th>
<th>PRO</th>
<th>ADV</th>
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<tbody>
<tr>
<td>Air blast scaled distance model (Charge per delay)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Automatic seismic correlation coefficient calculation (r2)</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Automatic air blast correlation coefficient calculation (r2 Air)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Floating attenuation law graph features</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Back-up feature of air blast records selection</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Field abacus for charge per delay vs. distance</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Seismic analysis (Filtering, FFT, compliance)</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>Fragmentation analysis (Photogrammetric Analysis System)</td>
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<td>✓</td>
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<tr>
<td>Automatic conversion in grey scale of uploaded image for optimized contrast</td>
<td>✓</td>
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<tr>
<td>Automatic adjustment of contrast from standard deviation of lightness</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>Automatic resizing of uploaded photo</td>
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<tr>
<td>Concatenated analysis of a set of images</td>
<td>✓</td>
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<tr>
<td>Drilling control (Automatic adjustment of hole depth to targeted elevation)</td>
<td>✓</td>
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<tr>
<td>Importing drill log &amp; automatic calculation of equivalent rock strength</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Deck charges analysis as regard dead pressing and sympathetic detonation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>2D Explosives Energy Distribution available in a choice of 5 scalable resolutions</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>2D Explosives Energy Distribution taking into account the timing sequence</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cost analysis module</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Automatic calculation of K &amp; alpha for a zone at a given distance &amp;/or period of time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Selections of seismic events for attenuation law purpose can be saved as scenarios</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Scenario attachment to a zone (selection of seismic events with the resulting k &amp; alpha)</td>
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<td>✓</td>
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<tr>
<td>Delete function of outliers directly from the attenuation law graph</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Attenuation law based on charge per delay for a custom time window</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Advanced seismic Analysis module:</td>
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<tr>
<td>p wave velocity</td>
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<td>Horizontal-to-Vertical Spectral Ratio</td>
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<tr>
<td>Transfer function</td>
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<tr>
<td>Waveform rotation</td>
<td>✓</td>
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<tr>
<td>Advanced filtering functionalities of Air Blast events</td>
<td>✓</td>
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# MAIN FEATURES

<table>
<thead>
<tr>
<th>SIMULATION FUNCTIONALITIES</th>
<th>DE</th>
<th>PRO</th>
<th>ADV</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPV simulation from Signature Hole (Far Field, Time domain)</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Far field / time domain</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Automatic application of calculated best inter hole delay to the sequence</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Automatically forecast of charge per delay at any point around selected zones</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Fragmentation simulation (for one hole with theoretical or real burden, spacing and profile)</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Calibration feature from maximum size measured</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Cast (flyrock) and muckpile shape simulation (for one hole with theoretical or real burden, spacing and profile)</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Calibration feature from maximum cast distance measured</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Air blast simulation (for one hole with theoretical or real burden, spacing and profile)</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>PPV simulation from charge per delay method (based on scaled distance model)</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>Air blast simulation for one hole, function of free face direction</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Iso PPV mapping (based on scaled distance model)</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>PPV simulation from Signature Hole</td>
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<td></td>
<td>✓</td>
</tr>
<tr>
<td>Near field / frequency domain option</td>
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<td></td>
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<tr>
<td>Far field / time domain option</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>3D Explosives Energy Distribution available in a choice of 5 scalable resolutions</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Automatic simulation for 10 automatic horizontal cuts</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Custom vertical cuts simulation</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>3D Explosives Energy Distribution taking into account the timing sequence</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Timing based automatic simulation for 10 automatic horizontal cuts</td>
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<td>NEW</td>
<td>✓</td>
</tr>
<tr>
<td>Timing based custom vertical cuts simulation</td>
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<td>NEW</td>
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<tr>
<td>Fragmentation simulation for the whole blast</td>
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<td>✓</td>
<td></td>
</tr>
<tr>
<td>Multi-rows cast simulation including real face profile</td>
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<td></td>
</tr>
<tr>
<td>Calibration feature from maximum size measured</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Cast (flyrock) and muckpile shape simulation (for several rows with real loading, burden, spacing and profile)</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Calibration feature from maximum cast distance measured</td>
<td></td>
<td>✓</td>
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</tr>
<tr>
<td>Automatic cast simulation in 2D for the whole blast (ejection speed, cast distance, trajectory, crater effect sim.)</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>3D cast simulation display of the whole blast</td>
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<td></td>
</tr>
<tr>
<td>Air blast simulation at zone level for the whole blast based on loading and the timing</td>
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<tr>
<td>Weather impact of air blast propagation for the whole blast (temperature and wind direction)</td>
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<tr>
<td>Damage simulation</td>
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</tbody>
</table>
### MAIN FEATURES

#### SIMULATION FUNCTIONALITIES (continued)

<table>
<thead>
<tr>
<th>Feature</th>
<th>DE</th>
<th>PRO</th>
<th>ADV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibrations amplification factor mapping (Based on frequency spectrum of a Signature Hole)</td>
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<td>✓</td>
</tr>
<tr>
<td>Deck / 3D charges option</td>
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</tr>
<tr>
<td>Fragmentation calculation (one hole based taking the initiation sequence into account)</td>
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</table>

#### OPTIMIZATION CAPABILITIES

<table>
<thead>
<tr>
<th>Feature</th>
<th>DE</th>
<th>PRO</th>
<th>ADV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic Inter charge / inter hole / inter row optimization delay calculation based on one hole</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Objective: to minimize PPV</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Far field / time domain</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Automatic application of calculated best inter hole delay to the sequence</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Automatic Inter charge / inter hole / inter row optimization delay calculation based on whole blast config.</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Minimize PPV or increase frequency or low PPV &amp; high frequency together</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Far field / time domain</td>
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<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Automatic application of calculated best inter hole delay to the sequence</td>
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<td></td>
<td>✓</td>
</tr>
<tr>
<td>P wave velocity calculation from combined seismic and air blast waveform</td>
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<td></td>
<td>✓</td>
</tr>
<tr>
<td>Far field / time domain option</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Deck / 3D charges option</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Waveform filtering in/out, low pass, high pass, band pass, rejecting</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Email notification when calculation is done + result in .txt attachment</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Estimated time to complete the calculation and percentage of completion of the calculation in a bar graph</td>
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<td></td>
<td>✓</td>
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<tr>
<td>Multicore / single core option for optimized calculation times</td>
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<td>✓</td>
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<tr>
<td>Automatic application of calculated best inter hole delay to the sequence</td>
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<td>✓</td>
</tr>
<tr>
<td>3D real time graph of Vp, frequency or optimized inter hole delay</td>
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</table>

#### DOCUMENT & REPORT YOUR BLAST

<table>
<thead>
<tr>
<th>Feature</th>
<th>DE</th>
<th>PRO</th>
<th>ADV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blast design report (automatically generated in .pdf format)</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Customized report incl. explosives list, hole loading, drilling pattern, detonator number, timing &amp; wiring pattern</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>GoogleMap™, Google Earth™-based location of the shot in the report (+ dedicated page)</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Customized corporate compliant report (colors, logo)</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Customized front page incl. 3D view of the blast / shot located on map / site logo / pre-blast photo / others</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
# I-Blast 7

## MAIN FEATURES

<table>
<thead>
<tr>
<th>DOCUMENT &amp; REPORT YOUR BLAST</th>
<th>DE</th>
<th>PRO</th>
<th>ADV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customized automatic conversion of delay in detonator numbers</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Detailed recap chart of detonators by length</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Paint-brush style edit feature for pdf</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Weather forecast, blast mats implementation and Blaster’s name custom fields</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Automatic back-up option in the database for the reports</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Customized blast time line</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>Simulation report (automatically in .pdf format)</td>
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</tr>
<tr>
<td>Cast simulation, vibration sim. (scaled distance and/or signature hole), regression law, fragmentation sim.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customized corporate compliant report (colors, logo)</td>
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<td></td>
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<tr>
<td>Paint-brush style edit feature for pdf</td>
<td>✓</td>
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<td></td>
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<tr>
<td>Monitoring / results report including seismic events, peak level and considered zone</td>
<td>✓</td>
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</tr>
<tr>
<td>Cumulative holes / overlap analysis in blast design report</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Drilling audit output in blast design report</td>
<td>✓</td>
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<th><strong>COMING SOON</strong></th>
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<th>PRO</th>
<th>ADV</th>
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<tbody>
<tr>
<td>DESIGN MODULE (CAD)</td>
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</tr>
<tr>
<td>Customizable position and size of texts and labels</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>ANALYSIS CAPABILITIES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explosive quantity adjustment according to actual quantity</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>DOCUMENT &amp; REPORT YOUR BLAST</td>
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<td></td>
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<tr>
<td>Signature Hole optimization report</td>
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<table>
<thead>
<tr>
<th><strong>AND MORE</strong></th>
<th>DE</th>
<th>PRO</th>
<th>ADV</th>
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</thead>
</table>
I-Blast ADV
Blasting 1 Million Tons, 205 Meters From a Town

Vibration simulation based on physics and relevant field data:

22% maximum deviation for PPV prediction on 1806 charges

Use of Deck Signature Hole technique.
Including parameters: Hole location and loading, Initiation Sequence, 6 dedicated Signature Holes
More in the 40th Annual Conference on Explosives & Blasting Technique proceedings, Denver, CO 2014
I-Blast ADV

Blasting 1 Million Tons, 205 Meters From a Town

Cast simulation based on physics and relevant field data:

<20% on horizontal cast prediction

Objectives: Evaluating horizontal cast from free face, chocke blast effect and cratering effect

More in the 40th Annual Conference on Explosives & Blasting Technique proceedings, Denver, CO 2014
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479 Charges, 13 Decks...
120 Meters Above a Crushing Plant

Based on physics and relevant field data:

<5%

on Horizontal Cast distance & Vibration Prediction

More in 41st Annual Conference on Explosives & Blasting Technique proceedings, New Orleans, LO 2015
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479 Charges, 13 Decks...
120 Meters Above a Crushing Plant

#1 - Hundred thousands points imported

#2 - Holes positioning for minimum flyrock & prevent fault plane opening

#3 - 3D simulation and calculations to keep charge per delay below 2 kg (4.4 lbs) = 13 to 20 decked charges in the deepest holes (25 m) (82ft)!

#4 - Searching for optimum delays using the signature hole method

#5 - Cast simulations for plant & residential area protection

#6 - Giving operators a hole loading plans per hole!

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95 % Advance guaranty in tunnel!
CHAVIMOCHIC project choice for performances

A – Blast Design and field instruction

B – Blast Initiation

C – Blast result
They Trust I-Blast

Bedrocked with more than two decades of experience with hundreds of users throughout the world in surface and underground blasting applications, working in mines, quarries, explosives supply, consulting, state administration, contracting and education.