

**Imagine**  
by Meglab



**INTELLIGENT, MODULAR AND EVOLVING**

TRACKING,  
MONITORING  
AND AUTOMATING  
YOUR  
UNDERGROUND  
OPERATIONS  
FOR A SAFER  
AND BETTER  
PRODUCTION

**meglab**



# MEGLAB EXPERIENCE

A pioneer in its field for over 20 years, Meglab delivers practical and reliable solutions to meet challenges in the mining industry. Working together with our customers to determine their needs, we develop future forward solutions to challenges facing the modern mine. Our vision focuses on improving safety, increasing productivity through process optimization, and reducing costs and the environmental footprint, all of which contribute to achieving our customers' objectives.



**ELECTRONIC**



**POWER**



**AUTOMATION**



**TELECOMMUNICATION**

OVER 270 EMPLOYEES, PROUD TO OFFER CUSTOM SOLUTIONS

# IMAGINE...

## A CONNECTED MINE



### INTELLIGENT



Simply and quickly collects and processes a large amount of information.

### MODULAR



The applications are independent and can be deployed gradually, depending on the needs of the mine.

### EVOLVING



Our design team continually works on product development to keep it up-to-date and to meet the changing needs of the industry.

## IMAGINE...

AN ACCESSIBLE, PRACTICAL AND ECONOMICAL SYSTEM, DESIGNED WITH MINES, FOR MINES

## IMAGINE...

A SINGLE SYSTEM, A SINGLE TECHNOLOGY TO CONTROL ALL MINING ACTIVITIES

## IMAGINE...

HAVING ACCESS TO REAL-TIME INFORMATION FOR FAST DECISION MAKING

## IMAGINE...

A SYSTEM THAT IS EASY TO DEPLOY AND WHOSE BENEFITS ARE OBSERVABLE FROM THE OUTSET

Using our collective expertise, the Meglab team has evaluated all available mining systems and technologies to develop our own integrated solution system in an attempt to re-envision the modern mine.

The result is IMAGINE, a web platform that provides the customer with a snapshot of the underground environment in real time. Collecting information on the location of workers and vehicles throughout the mine, IMAGINE intelligently tracks elements in the system, controlling ventilation and allowing for the transmission of various emergency warnings. The result is a safer, more efficient and more effective work environment at every level.





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## MAKE TODAY TOMORROW'S FUTURE

The IMAGINE software platform's modular design allows a number of components to be integrated. A central computer server hosts the software and the database, while satellite workstations allow for access to the system from anywhere in the mine.

These workstations put information about the work environment into the hands of the user, and are updated live, delivering an up to the minute picture of the location of elements within the system, both equipment and personnel. The software is easy to learn, and allows for easy filtering of information according to the needs of the user.

Tags attached to workers' lamps and vehicles are used to report their location to the server via terminals. Using Time of Flight (TOF) technology, the tags communicate with one another throughout the mine, calculating travel time of the RF wave between one another. This information is relayed to the workstation, providing a snapshot of the tags throughout the system at determined intervals.

IMAGINE is the tag out board of the future. It takes the guesswork out of determining where elements are in the mine, and puts real time information about the work environment in the palm of your hand.

### ADVANTAGES

**1**

Increases workers safety



**2**

Increases productivity



**3**

Reduces energy costs



**4**

Reduces ecological footprint





# TRACKING

In the modern mine, workers safety should be of paramount importance. Through tracking, Meglab offers an effective way to know the location of every worker and every vehicle at any time.

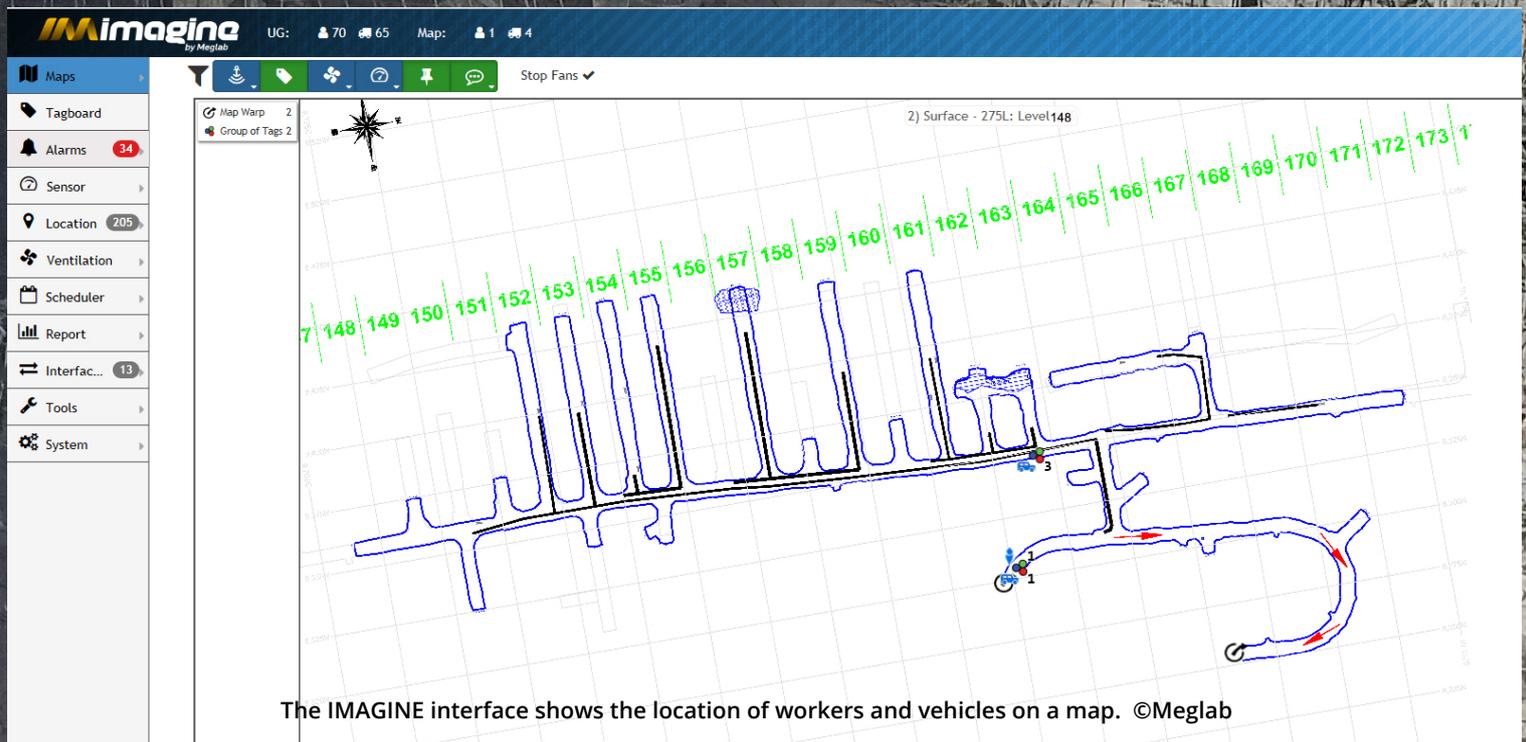
Tracking is the base module. It includes several features, and the licences and anchors can be added as the mine develops. Our system is effective for from small mines to bigger ones.



**WORKERS TRACKING**



**VEHICLE TRACKING**

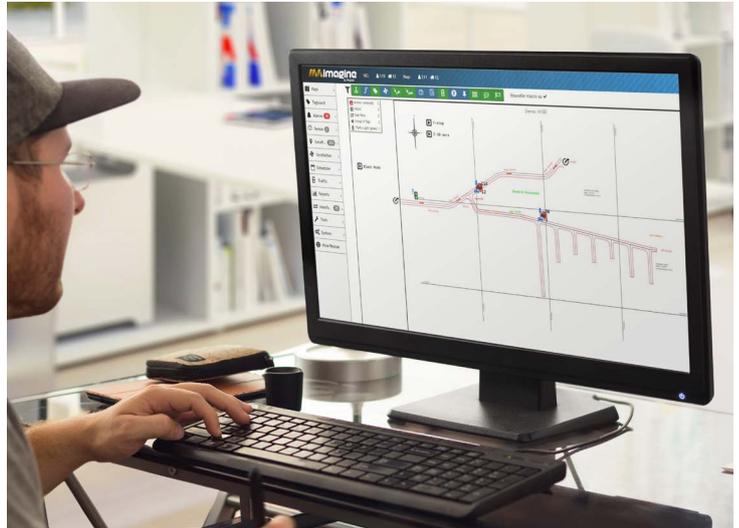


The IMAGINE interface shows the location of workers and vehicles on a map. ©Meglab

## HOW DOES IT WORK ?

Through a bidirectional transmitter (tag) affixed to workers' vehicles and lamps, using the anchors installed at strategic locations in the mine (underground, at the shaft level access, at the entrance to the ramp, on the badge board, etc.), the information is relayed to the server and is accessed via a web platform, which maps the location of all active tags throughout the mine on the software interface.

This web platform can be accessed on a variety of devices, from desktop computers to mobile devices (tablet, smartphone, etc).



The software is user friendly, allowing managers to configure the profile of new users or add equipment with ease.

## ADVANTAGES



### INCREASES THE EFFICIENCY OF THE TEAMS OF WORKERS

No more look for the scoop !  
Save time by knowing where vehicles are at all time



### INCREASES PRODUCTIVITY

The tracking feature allows operators and managers to make quick decisions according to the real time situations.



### PROVIDES INFORMATION FOR PRODUCING ACTIVITY REPORTS

Track your KPI's and produce reports by time or location



# STAFF LOCATION TAGBOARD

The tag installed in the miners' lamps makes it possible to locate workers if needed in case of emergency, for example.

By monitoring and recording worker movement throughout the system, users can optimize planning of work sequences and spot traffic hangups, increasing productivity.

The information on the location of workers can be consulted using the tagboard interface.

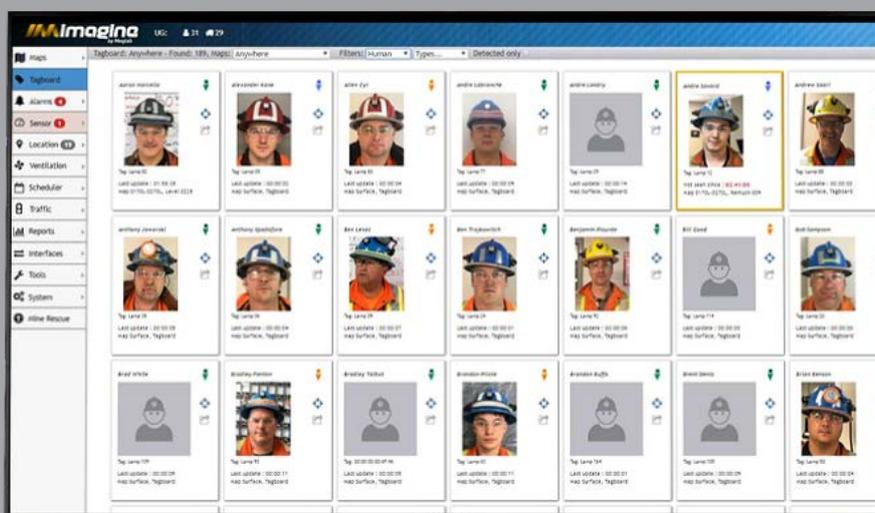
The interface is user-friendly and can easily be configured by the user to meet their specific needs. The tagboard can be used to search for various criteria. For example, the user may search all workers currently underground, or, more specifically, located at level 100.

This can be useful, especially during blasting. It is also possible to search for workers by job category, for example, to identify the electrician closest to a service call.

## ADVANTAGE



**INCREASES THE EFFICIENCY OF THE TEAMS OF WORKERS AND/OR RESCUE TEAM**



Workers are quickly identified using the tagboard ©Meglab

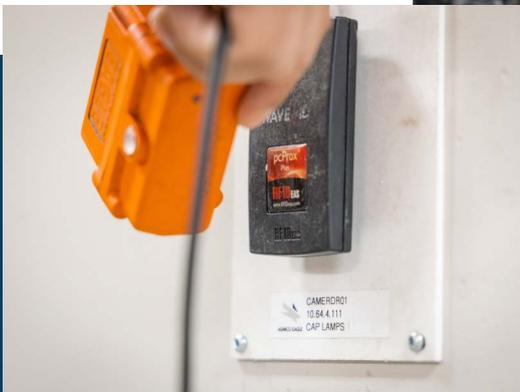


## SHOWS

- Name of worker
- Employment category
- Location in the mine

# LAMP ASSIGNMENT

The lamp allocation function allows lamps to be quickly assigned to workers at the beginning of their shift. At stations, the employee scans his employee card and the allocated lamp. The worker is now tracked using the tracking module.



## ADVANTAGES

- +** FAST AND SIMPLE
- +** REDUCED NUMBER OF LAMPS REQUIRED
- +** REDUCTION IN COSTS
- +** ACCURATE LOCATION OF ALL WORKERS WITHIN THE SYSTEM

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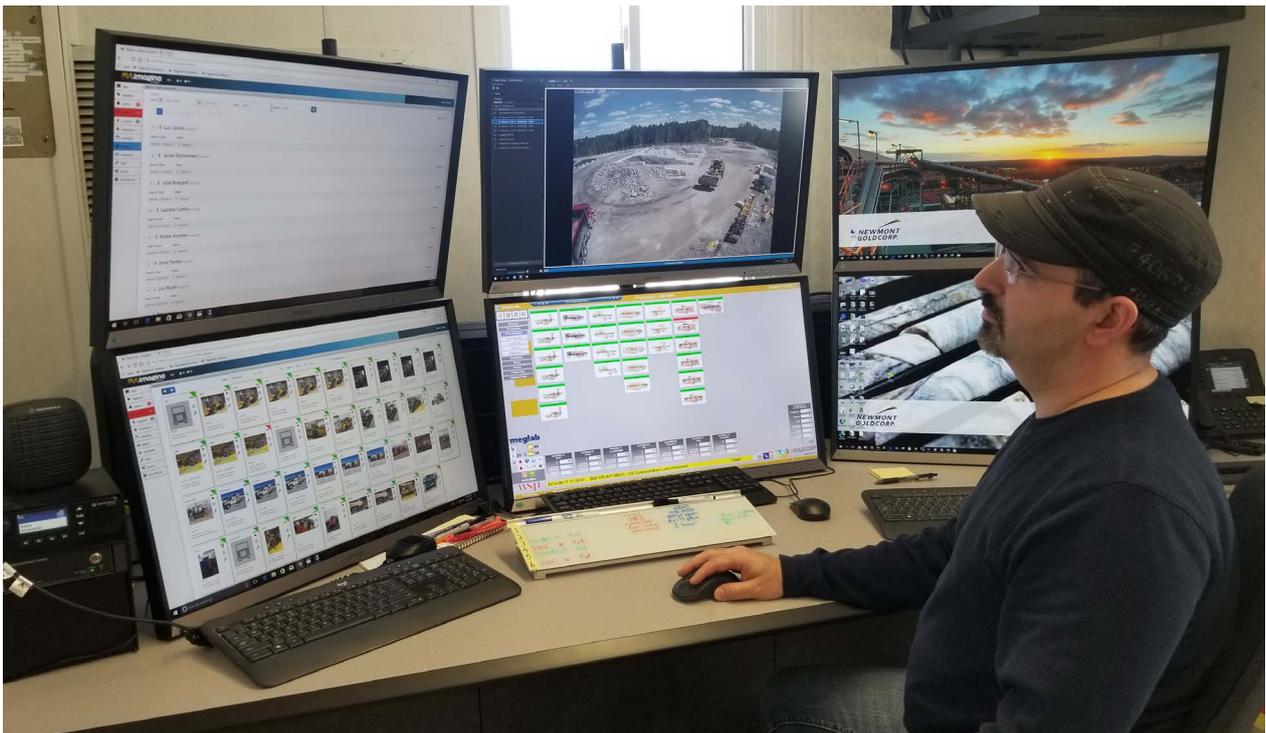
# VEHICLE LOCATION TAGBOARD

Each vehicle is equipped with a tag that identifies the vehicle's position in the mine. The tagboard interface makes it possible to locate all mobile equipment in the mine and show the availability and status of the fleet of vehicles. It is possible, at a glance, to see if a vehicle is working, out of order, undergoing maintenance, etc.

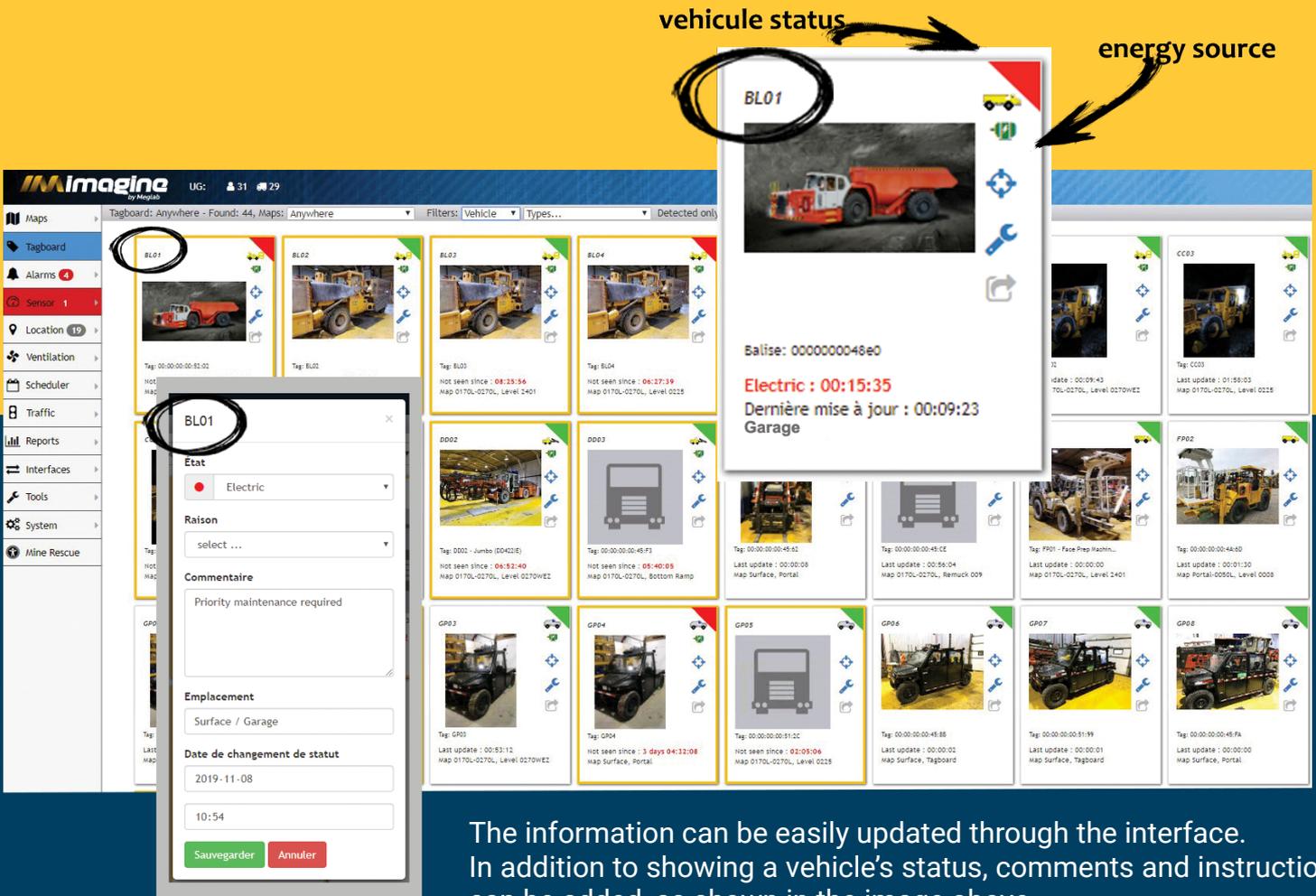
The tags can be programmed to identify details about the vehicles they are affixed to, most importantly the type of engine (diesel, electric, etc.), essential data for improving the efficiency of the ventilation module.

The vehicle location tagboard includes the following information:

- Name or designation;
- Location;
- Energy source;
- Status (available, out of order, etc.).



Shows the status and locations of the entire fleet of vehicles at a glance ©Meglab



The information can be easily updated through the interface. In addition to showing a vehicle's status, comments and instructions can be added, as shown in the image above.

## ADVANTAGES



**IMPROVES WORK PLANNING**



**INCREASES PRODUCTIVITY**



**REDUCES LOST TIME TO SEARCH FOR VEHICLES**



**REDUCES OPERATING COSTS**



**ELIMINATES THE LOSS OF EQUIPMENT**



**IMPROVES ENVIRONMENTAL PERFORMANCE (SEE VENTILATION)**



# ACCESS RESTRICTION

This function allows a worker to access different zones according to the given authorizations. For example, the powder room is locked, unless the tag is configured such as giving the access to certain people.



# ACTIVITY REPORTS

The IMAGINE system can generate customized reports. Two (2) types of reports are offered in the tracking module.

## Location (place)

Provides the timestamped movement of workers and/or vehicles for a given place over a given period of time.

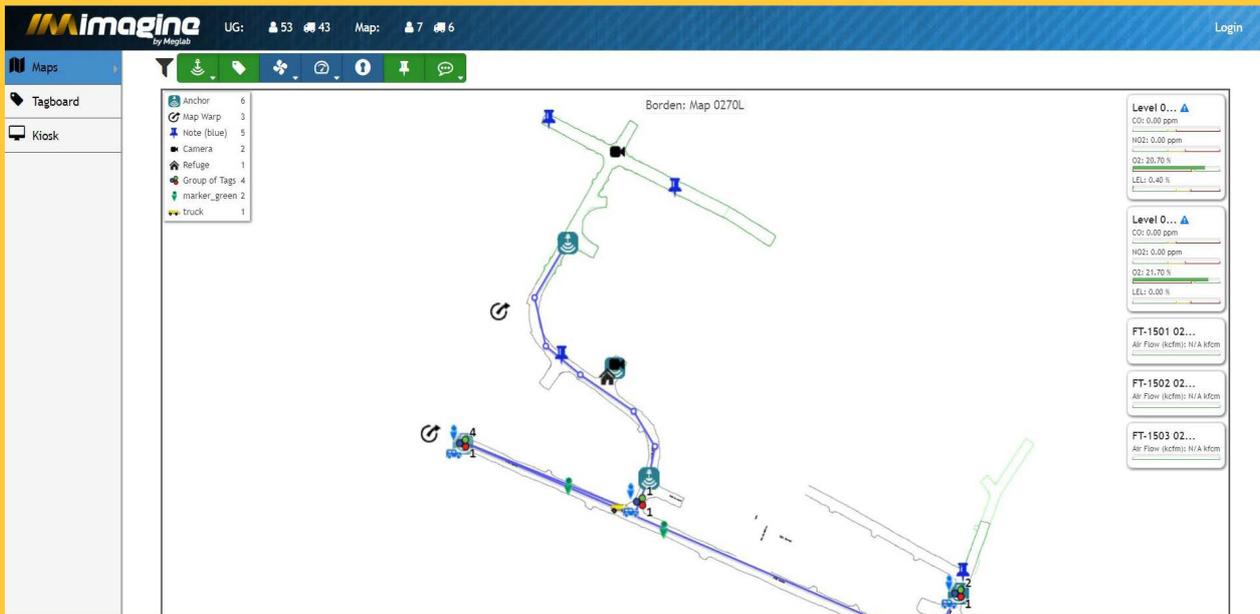
## Workers and vehicles

Provides a history of the movements of any particular worker or vehicle over a given period of time.

Date & Time	Name
2019-09-06 12:21:31	TR101 (TR101)
2019-09-06 12:21:22	Logan Wylie (Lamp 53)
2019-09-06 12:14:30	Ken Macdougall (Lamp 21)
2019-09-06 12:14:29	Justin Gauthier (Lamp 82)
2019-09-06 12:12:55	GPO4 (GPO4)
2019-09-06 12:12:55	Sean Lapointe (Lamp 23)
2019-09-06 12:12:51	Justin Gauthier (Lamp 82)
2019-09-06 12:12:49	Ken Macdougall (Lamp 21)
2019-09-06 12:10:50	TR101 (TR101)

Shows the workers and vehicles detected at the "Level 0008" terminal during a given period of time ©Meglab

# NOTIFICATIONS



This function is used to add a visual alert to the map to share important tags information with the teams. The ability to access this information through a single platform accelerates decision-making and reduces lost time. For example, an alert can announce that work is taking place at a specific location to avoid affecting operations. A web link can be included in the note.

- Shelter
- Terrain conditions
- First aid
- Cameras
- Equipment notifications
- General notifications
- Danger notifications

# SIMPLIFIED UPDATES



The IMAGINE system was created with easy software and component updates in mind. Terminals are automatically updated through the underground telecommunications system.

Tags can be updated over-the-air (OTA) at any time, ensuring that the system is always using the most recent software version and facilitating the incorporation of new modules selected by the client.

## ADVANTAGES

- ALL EQUIPMENT LINKED CAN BE UPDATED IN REAL TIME**
- NEW DEVELOPMENTS AND FEATURES CAN BE INSTALLED QUICKLY**

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# COLLISION AWARENESS

The large number of mobile equipment at a mine site comes with a risk of collision between two vehicles or between vehicles and workers. The collision awareness system (CAS) offers a safe and reliable solution to prevent this type of incident. It gives the operator a rapid warning (visual and audio), signalling the presence and number of persons and/or vehicles in the proximity with sounds and yellow and red warning lights.

## HOW DOES IT WORK ?

This system is affordable and designed to be autonomous – it works within the IMAGINE system using the communications infrastructure that comes packaged with the tag system throughout the mine.

IMAGINE software uses Time of Flight (TOF) technology, constantly updating software with details about the location of tags within the system by measuring the distance between tags.

When the vehicle is started, a system inside the vehicle reads the operator and passenger tags and checks that the collision awareness system is functional.

All mine vehicles are equipped with a tag powered by the vehicle's battery that can detect the presence of another tag in the vicinity (either a worker or another vehicle). Different reaction zones can be programmed in the CAS to emit a different warning to advise of danger within each given reaction zone.



## ADVANTAGES

**+ PRECISION AND RELIABILITY**

**+ CONTINUOUS VERIFICATION**

**+ TWO CUSTOMIZED ALARMS**

**+ MINIMAL MAINTENANCE**

**+ AUTONOMOUS**

**+ OVER-THE-AIR UPDATES IN REAL TIME**

# VENTILATION MODULES

The energy used for ventilation and the temperature regulation represent a large part of a mine's operating costs. IMAGINE provides a valuable energy efficiency tool that considerably improves (i.e. decreases) the energy consumption of a mine. Substantial savings are possible by controlling ventilation to places where workers and equipment are active, and by assigning fresh air on demand, according

to the actual needs of zones within the mine.

As with all elements of the IMAGINE software, the interface is intuitive and user-friendly. The configuration is simple and allows ventilation technicians to be autonomous when making adjustments without requiring a programmer or IT technician.

## HOW DOES IT WORK ?

IMAGINE works by automating fan startup and shutdown. Each fan is linked to a terminal that can detect the presence of tags on workers and vehicles in a specific ventilation zone (ventzone). When a worker or vehicle enters the ventzone, the ventilation system activates, increasing air flow to accommodate the needs of the equipment within the work environment. The fans can also be linked to each other to create a startup sequence. Two (2) options are currently offered for the ventilation module. See below.

## ADVANTAGES

- + ENSURES GOOD AIR QUALITY FOR MINERS**
- + REDUCES ENERGY CONSUMPTION (UP TO 40%)**
- + SIMPLE AND USER-FRIENDLY INTERFACE**
- + MAXIMUM PRODUCTION IN STRATEGIC LOCATIONS**
- + VENTILATION SEQUENCE FOR DIFFERENT SCENARIOS**
- + MODULATION OF VENTILATION IN WORK AREAS, AS NEEDED (OPTION A)**
- + LOWER MAINTENANCE REQUIREMENTS**
- + INCREASE IN FAN LIFE EXPECTANCY**





# VENTILATION OPTION B



**Imagine** by Meglab UG: 0 8 Map: 0 0 Login

Maps Tagboard Kiosk

0.LONGITUDINAL: OVERVIEW 323

LEVEL	FANS	LEVEL	FANS	LEVEL	FANS	LEVEL	FANS
xxx		370 IG		580 IG		730 IG	
xxx		390 IG		585 IG		740 IG	
xxx		400 IG		600 IG		760 IG	
xxx		425 IG		610 IG		785 IG	
xxx		435 IG		620 IG		800 IG	
xxx		450 IG		620 IG		820 IG	
xxx		470 IG		635 IG		840 IG	
xxx		490 IG		655 IG 1		860 IG	
xxx		510 IG		675 IG		880 IG	
xxx		535 IG		700 IG			
xxx		560 IG		720 IG			

635 IG Sen... CO: 5.43 ppm NO2: 0.00 ppm

740 EXP Sen... CO: 6.14 ppm NO2: 0.00 ppm

TO OVERVIEW X1

The standard ventilation module basically works in the same way as the proportional mode, the difference being that the fans cannot be programmed to function at a given percentage. When a fan starts, it works at full capacity.

# CYCLE COUNT

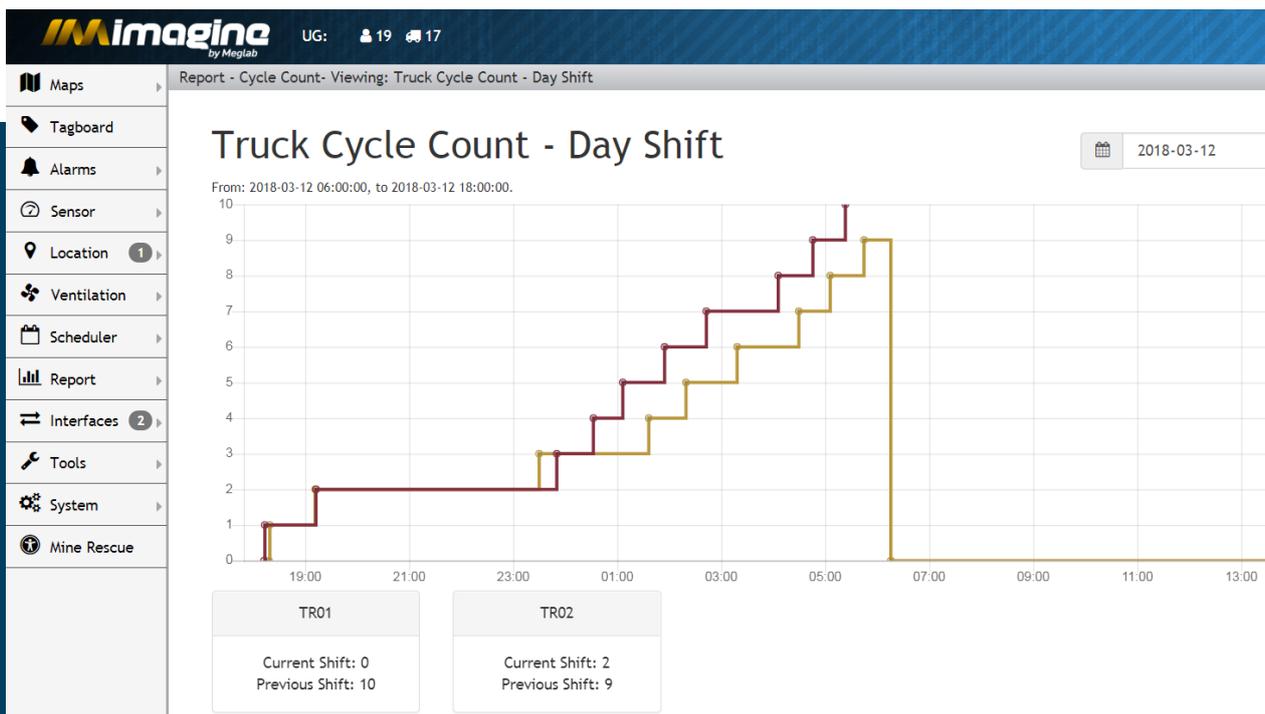
Improve the production by keeping track of the vehicle's movements. Using our tracking technology, this feature allows the control room operator to monitor multiple vehicle at the time.



## ADVANTAGES

**+** INCREASES PRODUCTIVITY;

**+** FACILITATE WORK PLANNING;



# MINE EVACUATION

Another function of the IMAGINE system is the option to order an emergency evacuation of the mine via the miners' lamps and to monitor the progress of the evacuation operation.

The lamp will flash to provide a visual alert (and/or an audible alarm) signifying that the workers must evacuate the mine. The IMAGINE module complements any evacuation signal already in place and managed by the mine, such as mercaptan gas.



The lamp alert is activated through a terminal, which holds the tag board, indicating the location of miners throughout the mine. The operator can monitor the progress of the evacuation operation, with the user interface indicating whether workers are in a shelter or safely evacuated or if they are still underground.

**imagine** by Meglab UG: 138 2 Évacuation de mine en cours admin

Sauvetage Minier

Tout Besoin d'aide Près du refuge sécurisé Sauveteur

Imprimer Exporter

Arrêter l'évacuation

Filter:

Sauveteur	Nom	Besoin d'aide	Localisation	Dernière vue	Statut	Actions
+	Timothy L. Carr		E-Pro	00:06:17	Safe (00:00:05)	⊕
+	Kenneth L. Parish		D-F100	00:04:38	Safe (00:00:05)	⊕
+	Mark Y. Brown		E-Pro	00:01:09	Safe (00:00:05)	⊕
+	Michael L. Harris		D-F100	00:11:52	Safe (00:00:05)	⊕
+	Mike J. Torres		D-F100	00:05:24	Safe (00:00:05)	⊕
+	Phillip E. Belcher		D-F100	00:00:41	Safe (00:00:05)	⊕
+	Priscilla C. Esposito		D-F100	00:12:10	Safe (00:00:05)	⊕
+	Ricky D. Coyle		D-F100	00:02:04	Safe (00:00:05)	⊕
+	Russell E. Hale		D-F100	00:16:26	Safe (00:00:05)	⊕
+	Samuel K. Zimmerman		D-F100	00:08:42	Safe (00:00:05)	⊕
+	Stephanie I. Fitzgerald		D-F100	00:01:23	Safe (00:00:05)	⊕
+	Walter C. Dukes		D-F100	00:10:55	At risk (00:00:05)	⊕

# CALL FOR ASSISTANCE

Two (2) types of calls for assistance are available through the IMAGINE platform.

## PANIC BUTTON

By means of a tag attached to the lamp and by pressing a button on the lamp, the worker sends a signal to the surface to indicate that he is in distress and/or that he needs help.



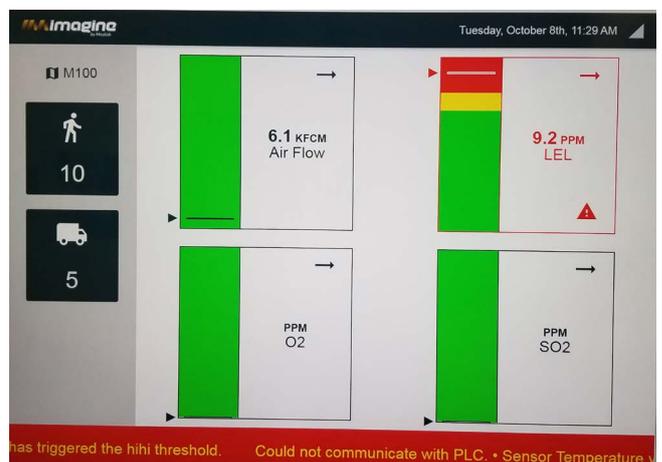
## MAN DOWN

By means of an accelerometer in the lamp, a signal is sent to the surface if the worker loses consciousness or suffers a fall and is immobile for a certain period of time. The operator at the surface can then attempt to communicate with the worker and if there is no reply, the operator sends help. The procedures vary according to the type of lamp and the worker must be within the anchor's coverage area for the call for assistance to be transmitted to the surface.

# MONITORING

## OPTIONAL:

Installing monitors in ramps, gallery or at surface allows to display information such as gas sensors values and security messages. Additional screens could also be installed underground to get information about workers and vehicles position.



# MOBILE VERSION

Imagine mobile version shows all the information from a tablet, a multimode radio or a smartphone.





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MALARTIC (QUÉBEC) J0Y 1Z0  
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