



CHALLENGING LIGHT  
FOR OUR PARTNERS

# VISI+: VISIBILITY ENHANCEMENT

## KEY APPLICATIONS

### UNDERGROUND MINING RESCUE IN SMOKY & DUSTY CONDITIONS

- Provide details that help in the positioning of objects/people
- Distinguish and see casualties on the ground to react swiftly and adequately
- Considerably reduce intervention time
- Greater safety/sense of control for rescuers
- Enhanced fire fighting efficiency

### MINING OPERATION (BLIZZARD, DUST & FOG)

- Allow emergency vehicles to operate more safely even in bad weather conditions
- Allow operations to continue regardless of the weather conditions
- Reduced visibility and rapid changes in weather conditions can stop rescuers from doing their job and even put their lives at risk



Visi + Prototype

Vision with Visi +



Vision with a standard camera



Vision with Visi +



Vision with a thermal camera

## ADVANTAGES

- Makes it possible to see through dense smoke better than the naked eye
- Fire flames visible at 10 m
- Delivers much more details than thermal camera in cold drift
- Double the visibility in extreme conditions
- Perfect for ice roads

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# INO'S SOLUTIONS

INO is the largest center for industrial optics and photonics expertise in Canada. As a leading technology developer and provider, INO is home to the largest concentration of skills in the field in Canada. Over the years INO has developed many technologies that can bring solutions to some problems in the mining industry.



### VISI +: VISIBILITY ENHANCEMENT

This system is a camera with an invisible illumination that provides an enhanced image of the environment in adverse conditions such as fumes, dust, fog, snow, blizzards, etc. It can be used by mine rescue teams, emergency vehicle drivers, and ice road convoys.



### 3D LASER PROFILER: DRIFT AND ROAD SHAPE MONITORING, ROCK SIZING

INO has developed multiple systems based on its 3D laser profiler over the last 15 years, among which are road profilers that can operate at speeds of 100km/hour. This technology could make it possible to scan drifts in 3D at mm resolution and yield realistic information on drift shape and material inventory. This could also be used for sizing rocks running on conveyor belts, in scoops or dump trucks.



### HYDRA: REMOTE DUST MONITORING

This system offers the ability to monitor, map, and measure the flow of particles dispersed in the air or in water in real time. It can then be used in mining applications to monitor stack plumes. It could also be a tool to help manage dust emissions from drilling processes or heavy vehicles in open pits. It is well suited to help shed light on and control environmental problems related to fugitive aerosol emissions.



### LIF/RAMAN: MINERALS AND ROCK COMPOSITIONS

This technology could have applications for rock sorting or be used as a tool to help geologists figure out the mineral content of drift walls in mining exploration or operations. It is based on optical fluorescence and Raman properties of molecules and thus complements the information that X-ray devices give about the elemental composition of rocks. It can be made into a handheld device that can be applied directly in the field.



### HYPERSPPECTRAL CAMERA: ROCK COMPOSITION

Hyperspectral cameras combine the power of spectroscopic analysis with vision analysis by collecting and imaging the reflectance spectra. This technology has emerged in recent years as a superior alternative to color and black and white vision systems, both of which have a limited capability to discriminate materials of similar colors and tint. What sets INO's hyperspectral system apart is its ability to handle fast-moving material such as rocks moving on a conveyor belt at up to one thousand feet per minute.

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## INO'S OFFERINGS

> PROTOTYPING

> SHORT RUN PRODUCTION

> TECHNOLOGY TRANSFER