



A Rockwell Automation Company

Central Canada Potash Mine AUTONET

The Client:

Central Canada Potash, a division of Noranda Minerals Inc. is an underground potash mine and mill located near Saskatoon, SK Canada. The mine uses the room and pillar mining method with continuous mining

machines at the face and a conveyor system to move the ore to the shaft. It has a capacity of 1,400,000 tons of muriate per year. Production began in 1969 and has a remaining mine life of 120 years.

The Requirement:

The mine AUTONET system was conceived by Central Canada Potash (CCP) to improve both the profitability of their mining operations and the environment of the mining machine (miner) operator. The system is comprised of three sub-systems, the miner automation, the mine wide communications system, and the central Monitoring and Control System (MACS).

The miner automation is being developed in stages with the final goal being an operator-free miner that uses a series of guidance sensors to keep the miner on track. The first two requirements are for vertical and horizontal guidance, the third is for automatic guidance in cutting the chevron rooms, with the final phases being connecting the system into the mine wide

communications system and the MACS.

The mine wide communications system consists of a Distributed Antenna System (DAS). The DAS technology will allow simultaneous transmission of voice, data and video. The system will be fully integrated to all the miner automation systems via radio links to the PLCs and computers on the miner.

The MACS will provide a central control interface for controlling all underground equipment including miners, conveyors, storage bins, loading pockets, skips and silos. The system will provide both manual and automatic control and provide a wide array of diagnostic and alarm information to the operator.

The Design Solution:

Hinz was retained by Central Canada Potash to assist in the research, development and implementation of the three sub-systems that make up AUTONET. Hinz was responsible for developing the computer and PLC software for all control aspects, as well as the design of all necessary instrumentation and electrical interfaces.

The first subsystem to be developed was the miner automation. The first requirement is for miner guidance systems. Vertical guidance was achieved by using an Itran machine vision system to detect and follow a clay seam which is the upper boundary of the desired ore body. This vision system's interface card is VME-bus-based and resides in the GE-FANUC Series 90 PLC rack. This will allow for fast, accurate camera information being sent to the PLC. The second guidance requirement is straight-ahead horizontal

movement which was achieved using a laser spot for a vision system to follow. The final guidance requirement was horizontal control in the wings and stresses of chevron rooms. Noranda Technology Center (NTC) developed a guidance system similar to the Ring Laser Gyro system which is used in weapons guidance by the US military. This system was interfaced to the PLC which will interpret the information to perform miner movement.

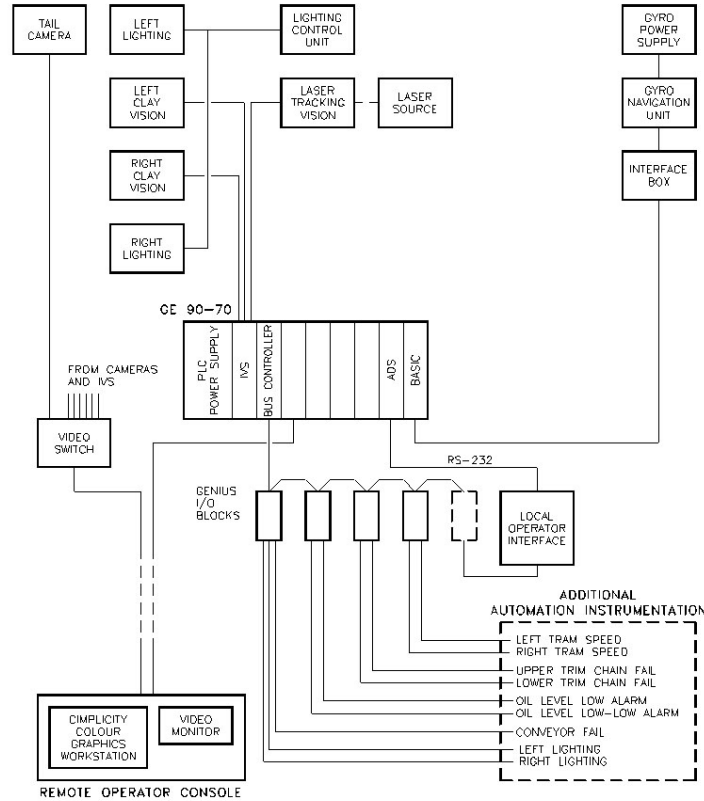
The second subsystem required for AUTONET was the DAS based mine wide communications system. DAS is being used instead of a leaky feeder system primarily due to lower capital costs and the improved performance due to both the reduced multipath and

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delay spread that DAS exhibits and the waveguide properties of the long straight entries in a potash mine. DAS is a broadband system based on CATV technology.

The final subsystem was the Monitoring and Control System (MACS). This system uses the GE-FANUC Cimplicity - U operator interface which operates on eighty 486-based personal computers.

The workstations are located at different locations, both underground, and the surface. The initial underground locations include the shift coordinators office, the electrical maintenance shops and the skip tenders station. Future locations include the mine engineering office on the surface.

The complete system is now operational. The DAS is being used for voice data and video, and the system is continuously being expanded.

For further information or to contact a Hinz office near you, please check our website at:

www.hinz.com