



OIT's Mining Partnership Portfolio

Materials & Equipment

- ◆ Teleoperation & Robotics
- ◆ Fluid Analysis Systems
- ◆ Crosswell System for Imaging Ahead of Mining
- ◆ Electromagnetic Wave Detection and Imaging
- ◆ Computerized Roof Bolt Design System
- ◆ Mapping with Natural-Induced Polarization
- ◆ Fuel Cell Mining Vehicles
- ◆ 24-Channel Geophone Array for Boreholes
- ◆ Fibrous Monolithic Composites
- ◆ Hybrid Pressure Casting Process and Coating Treatments
- ◆ CastCon Process
- ◆ *Tough-coated Hard Powders*
- ◆ *Variable Wall Mining with Dual Duct Ventilation*
- ◆ *Ramex Tunneler*
- ◆ *Improving Refractory Service Life and Recycling*
- ◆ *Wear-Resistant Intermetallic Alloys*

Mine-Site Energy

- ◆ Plant-wide Assessments
- ◆ Process Heating
- ◆ Motor and Pump Systems
- ◆ Steam and Compressed Air Systems
- ◆ Safe and Low-Cost Hydrogen Storage for Fuel Cell Mining Vehicles

Production Efficiency

- ◆ Laser-Induced Spectroscopy for Ore Grading
- ◆ 3-D Grinding Mill Software
- ◆ X-ray Spectroscopy for Drilling and Blasting
- ◆ Calibration Methods for On-line Analyzers
- ◆ Dense-Medium Cyclone Design
- ◆ Real-Time Coal/Ore Sensor
- ◆ Projectile-based Excavation
- ◆ Comminution Circuit Optimization
- ◆ *Filtering Molten Metal*
- ◆ *Density Separation in Fluidized Beds*
- ◆ *Advanced Blast Furnace Control*
- ◆ *Clog-Resistant Submerged Entry Nozzles*
- ◆ *On-line, Non-Destructive Measurement of Properties*
- ◆ *Alkane Functionalization Catalysis*
- ◆ *Multi-phase Computational Fluid Dynamics*
- ◆ *CFD for Multi-Phase Flow*
- ◆ *Thermal Imaging Control of Furnaces and Combustors*
- ◆ *Remote Automatic Material On-line Sensor*

New Products & Markets

- ◆ High-Temperature Superconductors for Underground Communications
- ◆ Wireless Mine-wide Telecommunications
- ◆ *Baghouse Dust to Chemicals*
- ◆ *Underground Telemetry Communications*
- ◆ *Carbon Products*

Environment

- ◆ Selective Flocculation of Fine Particles
- ◆ Dewatering Fines
- ◆ Air-Sparged Hydrocyclone Treatment of Cyanide Solutions
- ◆ *Magnetic Elutriation for Iron Ore Processing*
- ◆ *Oscillating Combustion to Reduce NOx*

Recycling

- ◆ By-product Recovery
- ◆ *Briquetting Blast Furnace Feedstock*
- ◆ *Recycling Waste Oxides into Primary Process*

Mining R&D Investment (Million dollars)

	OIT	Cost Share	Total
Direct	\$9	\$9	\$18
Related	\$15	\$8	\$23