MICA
Mining Innovation
Commercialization Accelerator

ACIM
Accélérateur de Commercialisation
d'Innovation Minière

Managed by | Projet dirigé par

CEMI
Centre for Excellence
in Mining Innovation

With funding from | Avec un financement du

Canada

micanetwork.ca | reseauacim.ca

The Centre for Excellence in Mining Innovation

Established 2007, Not-for-Profit, Sudbury, Ontario.

CEMI
Centre for Excellence in Mining Innovation

Vision:

Help Mines solve their Challenges, by making the future happen, tomorrow.
CEMI accelerates the Commercialization of Innovation into the mining industry.

Mission:

To advance innovation that will help the mining industry to:

- **find more ore,**
- **mine more safely and effectively,**
- **generate more value from mines,**
- **have a more benign impact on the environment**
- **have a more beneficial impact on communities.**

CEMI: The Mining Innovation Niche

Research → **New Knowledge**

Innovation → **New Business**

CEMI
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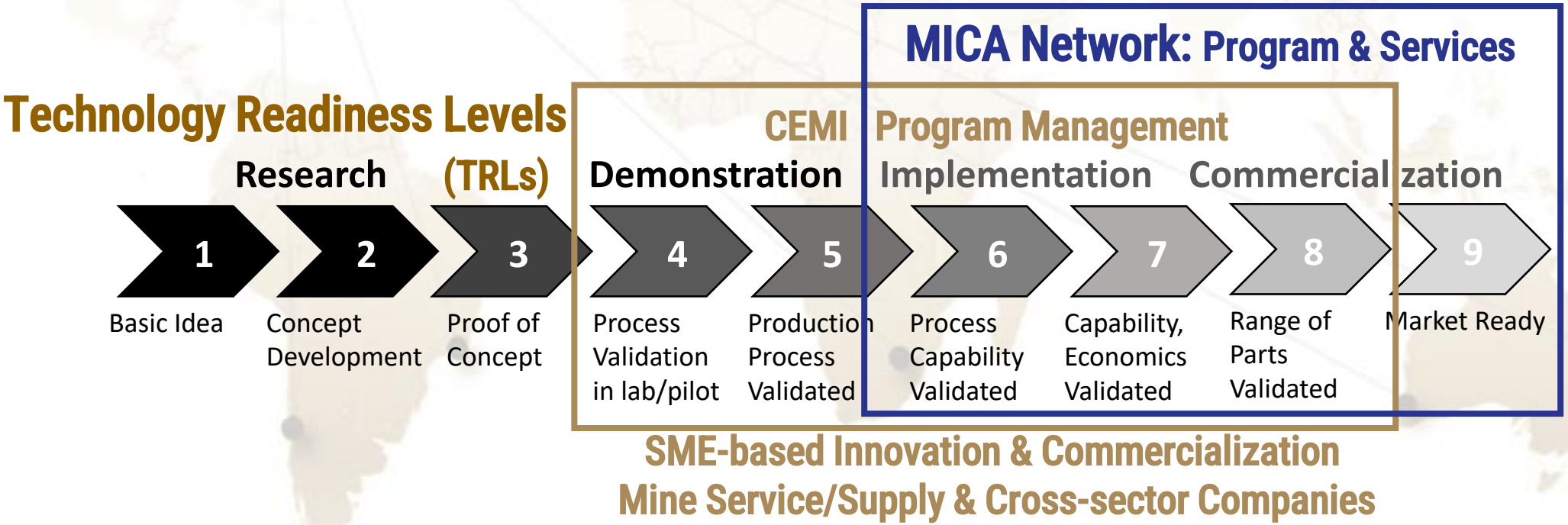
Step-change Innovation: incr. 200 - 300% in performance
decr. 50 - 66% in cost



SME-based Innovation & Commercialization
Mine Service/Supply & Cross-sector Companies

CEMI's Commercialization Services

Commercialization Services

- Conducts innovation and commercialization gap analysis assessments and offers Innovation and Commercialization business services to bridge identified gaps.

Innovation Scouting

- Global search for current and emerging pre-commercial late-stage solutions with applications to mining

Challenge Identification

- Review of existing challenges and problems from technology road maps and uncovers hidden challenges using a systems analysis process

Challenge/Solution Matching

- Matches and connects current and emerging pre-commercial solutions with validated industry challenges

MICA Main Partners

BRIMM
BRADSHAW RESEARCH INITIATIVE FOR MINERALS & MINING

InnoTech ALBERTA
A SUBSIDIARY OF ALBERTA INNOVATES

SASKATCHEWAN POLYTECHNIC

CEMI
Centre for Excellence in Mining Innovation

MaRS

misa

cna
College of the North Atlantic

MICA ACIM

Managed by CEMI

Main Partner Selection and Responsibilities

- Main Partner Selection Why/How?
- Support & Host Network Activities
- Conduct Ecosystem Mapping
- CEMI Board Position
- Identify MICA Subscribers
- Help MICA Achieve KPI's

MICA VISION

To connect Regional Mining Clusters to Cross-Sector Innovation Centers across the country to create a National Network to commercialize innovations into the mining industry and use the Canadian advantage of SME-based innovations to create a national mining technology ecosystem.

MICA's MISSION

Build	**BUILD** a national ecosystem as a network of collaborative regional networks.
Accelerate	**ACCELERATE** the number and scale of Canadian SMEs engaged in mining.
Create	**CREATE** regional networks and rapidly increase domestic and export sales.
Commercialize	**COMMERCIALIZE** new, late-stage, high-impact mining technologies.
Attract	Help SMEs **ATTRACT** investment for scaling up to participate in global supply chains.

MICA Network Activities

- Regional National
- Cross-Sector Engagement
- Technology Specific
- Working Groups
- Technology Show-cases
- Tradeshows Conferences
- Demo Days
- Custom Events
- Webinars

MICA Commercialization Services

- Readiness Assessments
- Business Support
- Technology Development
- Evaluation Validation
- Client Testing and Adoption
- Knowledge Tech Transfer
- Intellectual Property Navigation
- Introductions
- Funding Support
- Export Development
- Partnerships
- Case Studies

Four MICA Technology Focus Areas

Productivity	Increase Mine Productive Capacity, at Lower Cost.
Energy	Reduce Mining Energy Consumption and GHG Emissions.
Smart	Implement Smart, Autonomous Digital Mining Systems.
Environment	Reduce environmental risk and long-term liabilities.

MICA ACIM

Increase Mine Productive Capacity, at Lower Cost.

Technology Readiness Level (6-8) Technologies in the following areas:

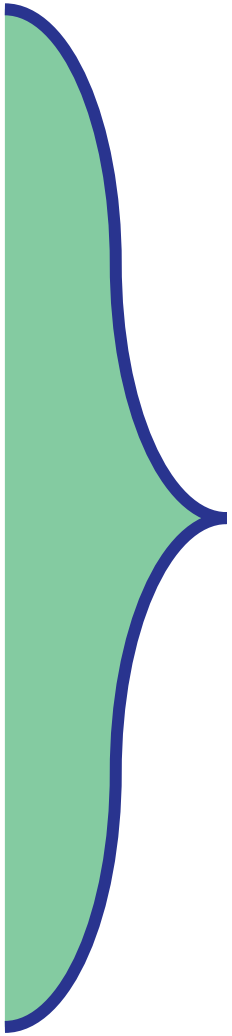
- Smaller, faster, more effective equipment
- Remote and Autonomous mining technologies
- Alternative material transportation technologies, conveyors
- Advanced PPE, Biometrics, wearables, Covid-19 Response technologies
- Enhanced data collection/process for decision support systems
- Supply chain and procurement optimization (reduce inventory)
- Ore sorting, ore up-grading and waste diversion technologies (source/mill)
- Increase concentration and increase recoveries (in situ, & narrow vein mining)
- Optimized blasting and explosives design (drill hole optimization)
- Mitigate seismic risk, Hydraulic Preconditioning
- Face preparation technologies, rapid development applications
- Directional drilling, Intelligent Drilling technology
- Increasing critical minerals/metals (REE) extraction, concentration and recovery
- Employee Personal Mental Health Wellness Improvement
- Mechanical Rock Excavation (MRE) , Rock cutting technologies

Potential MICA Project areas of Focus.

Reduce Energy Consumption and GHG Emission.

Technology Readiness Level (6-8) Technologies in the following areas:

- Clean energy generation, energy storage, heat sinks
- Heat recovery, heat capture, low-grade heat
- Ventilation, cooling, micro-cooling, natural cooling systems
- Production scheduling, reducing inventory
- Mine automation
- Whole mine electrification, energy management
- System wide automation and sensors
- Reduce energy in comminution; Microwave technologies
- Alternative energy mining vehicles; Hybrid Vehicles
- Battery-electric power (BEVs), Benchmarking, BEV Tracking
- BEV 2nd Battery Life (Reuse – Repurpose + Recycle)
- Biodiesel and Fuel cell-electric powered vehicles (Hydrogen)
- Benchmarking, Regulations and standards
- SMR (Small modular nuclear reactors), Micro-Grid

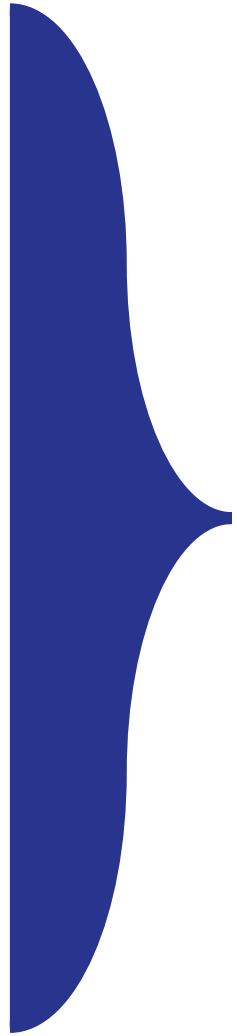


Potential MICA Project areas of Focus.

Mitigate Environmental Risk and Long-term Liabilities.

Technology Readiness Level (6-8) Technologies in the following areas:

- Alternate use of reject materials
- Air quality, diesel engine emissions filters, dust, control, real-time monitoring
- Reduce downstream emissions/GHG (measure)
- Water quality, conservation, treatment, quality sensors
- Improving Water Recovery and Recycling in the Milling Process
- Land reclamation and remediation technology, Organic Covers
- ISL/ISR (in situ leaching/recovery
- Genomics approaches to tailings management
- Autonomous and remote monitoring technologies (mining cycle)
- Enhancing Mine Waste Management
- Recovery of minerals and metals leaching effluents
- Secondary processing of mine waste products
- Tailings dam management, Acid mine drainage removal
- Mining value from waste and Waste decontamination, Recycling
- Ecosystem Restoration and Mine Closure



Potential MICA Project areas of Focus.

Implement Smart, Autonomous Mining Systems

Technology Readiness Level (6-8) Technologies in the following areas:

- Automation, Tele-remote
- Drones, UAVs and Robot Applications (hyperspectral imaging)
- Surveillance, video analytics, thermal imaging, tracking, monitoring
- Sensors; improved data analytics;
- Pattern recognition; predictive analytics; predictive maintenance
- Innovative new mining equipment
- Artificial Intelligence (AI), Augmented Reality (AR) and Machine Learning
- Remote Sensing (LIDAR), Virtual Reality (VR), 3D Simulations
- High-performance computing, Digitization, Communication Networks
- Business case simulations, process simulation, digital twins
- Enhance Human machine interface, Enhance human response and performanc
- Technology to enhanced training and skills for the digital era
- 3D printing applications
- Blockchain, Traceability of Resources

Potential MICA Project areas of Focus.

National Network Ecosystem

Mine Operators	SMES	Academic
Research	Business	Investment
Industry Groups	Government	Associations
Accelerators	Incubators	NFP

Benefits to Mine Operators

- **Early Adoption**
- **Demonstration Sites**
- **Innovative Solutions**
- **Seek Solutions**
- **Leveraged Funding**
- **Network's Activities**

Benefits to Innovation Organizations

- **Leveraged Funding**
- **Complementary technological**
- **Commercial Capabilities**
- **Cross-sector Collaborations**
- **Market Opportunities**
- **Capacity-Building Services**
- **Investment**

Rationale for Membership

Create a National Network

Organized Managed Platform

Cooperative Collaborative Environment

Membership Categories

Students & Professional
$125/yr

Associate NFP +
$850/yr

International
Starting 2022

SME 1
$1.5K/yr

SME 2
$5K/yr

SME 3
$8K/yr

Junior Mining
$8K/yr

Mining Operator 1
$25K/yr

Mining Operator 2
$35K/yr

How to Join

Request Membership

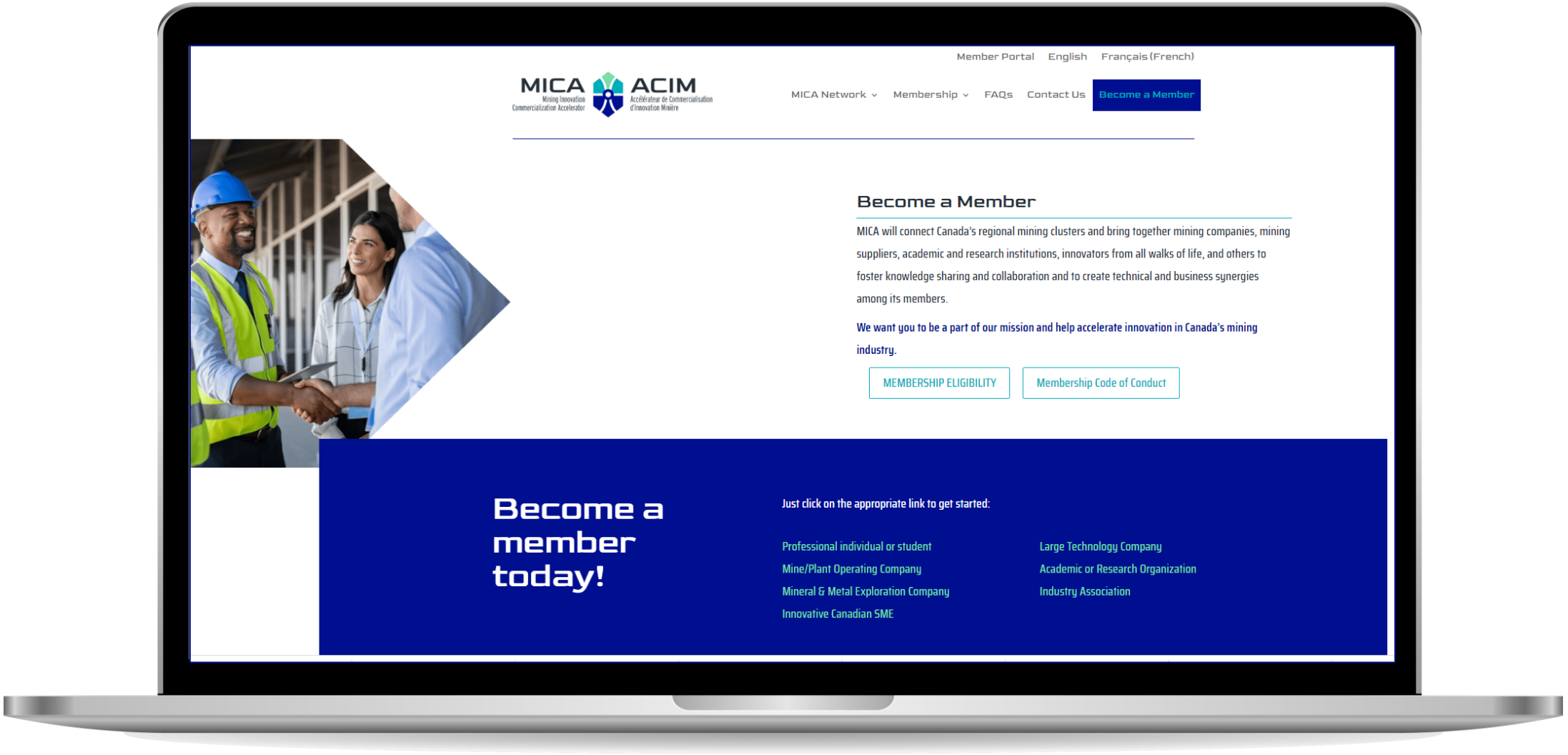
Eligibility

Interview

Approval

Subscription

Onboarding



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OVERVIEW OF PROCESS
(Through to Project Funding)

Phase 1
Initial Application,
Evaluation and Feedback

Phase 2
Full Application
Evaluation and Feedback

Approval
Funding Allocation and
Agreement

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