## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>THANK YOU</td>
</tr>
<tr>
<td>4</td>
<td>OUTGOING CHAIR’S MESSAGE</td>
</tr>
<tr>
<td>5</td>
<td>CHAIR’S MESSAGE</td>
</tr>
<tr>
<td>6</td>
<td>BOARD OF DIRECTORS</td>
</tr>
<tr>
<td>7</td>
<td>STRATEGIC PLAN 2022-2025</td>
</tr>
<tr>
<td>8</td>
<td>OPERATIONAL BRIEFING</td>
</tr>
<tr>
<td>9</td>
<td>WORKING GROUPS</td>
</tr>
<tr>
<td></td>
<td>Asset Management</td>
</tr>
<tr>
<td></td>
<td>MM-ISAC/GMG Cybersecurity (Joint)</td>
</tr>
<tr>
<td>10</td>
<td>Artificial Intelligence</td>
</tr>
<tr>
<td>11</td>
<td>Autonomous Mining</td>
</tr>
<tr>
<td>12</td>
<td>Data &amp; Interoperability</td>
</tr>
<tr>
<td>13</td>
<td>The Electric Mine</td>
</tr>
<tr>
<td>13</td>
<td>Sustainability</td>
</tr>
<tr>
<td>14</td>
<td>Mineral Processing</td>
</tr>
<tr>
<td>15</td>
<td>Underground Mining</td>
</tr>
<tr>
<td>16</td>
<td>COMMUNITY GROWTH</td>
</tr>
<tr>
<td>17</td>
<td>FINANCIALS</td>
</tr>
</tbody>
</table>
10 YEARS AND GROWING

GMG is an open organization that has brought together a diverse, expert community within the global mining industry for a decade to align, collaborate and share good practices to support the operationalization of innovation.

Together with our members, participants and partners we have produced quality guidelines and other educational resources, allowing us to make industry knowledge available in a structured way.

Thank you to our leaders who have spearheaded GMG's growth from idea to the globally recognized organization we are today:

- Tim Skinner, Chair 2012-14
- Andrew Scott, Chair 2014-16
- Helius Guimaraes, Chair 2016-18
- Michelle Ash, Chair 2018-2022
- Kalev Ruberg, Chair (current)

Thank you to our global, multi-stakeholder community of informed voices for sharing their time, knowledge and passion to advance the industry's goals towards a safe, sustainable and innovative future for mining.

We are looking forward to the next 10 years!
This year GMG celebrates its 10th anniversary as a leading hub for the global mining community. I’m incredibly proud of the impact we’ve had in the industry and what we’ve accomplished in my 3 years as Chair.

Through recent dialogue and engagement, our members’ voices were heard, and their desire for GMG to continue its efforts of bringing the global community together remains unwavered.

When I became Chair in 2018, I jumped into this community of informed voices enthusiastically with two feet. I traveled tens of thousands of miles to meetings, conferences and conventions with the goal of advancing the mining industry through GMG’s vision of global alignment and collaboration. Through these efforts I built and strengthened relationships as many of you have during your participation in GMG.

We’ve published nine guidelines, two white papers, case studies, reports and more which have provided essential guidance in such areas as applying functional safety to autonomous systems, implementing short interval control in underground mining, recommended practices for battery electric vehicles and much more. Sharing best practices is at our core and will serve to make the industry safer, innovative and sustainable. This is also a testament of the importance of collaboration and the arduous work that goes on behind the scenes from passionate people to advance our industry.

On this, I am excited about our most recent publications. The “Guideline for Sharing Open Data Sets in Mining”, published in April, contains best practices for data sharing that are based on existing initiatives so that they can benefit from the opportunities that open data can offer. “Recommended Practices for Battery Electric Vehicles in Underground Mining – Version 3”, published in June, provides guidance and overall discussion about the benefits, drawbacks, and planning needed to design and implement a BEV fleet within an existing or new mine.

One of my main goals as Chair was to solidify GMG’s global reach. Our brand recognition has grown, and participation and membership have increased from 2,500 to 6,022 participants and 86 to 121 member companies, respectively. GMG is recognized around the world as an organization that operates with integrity. I’m proud to be a part of it.

Much work was also done to update GMG’s governance, in the lead up to and since becoming an independent organization. Your Executive Council, Governance Committee and Leadership Advisory Board have done a tremendous job for which I’m eternally grateful. Our experiences make up who we are, and the work that went into solidifying our independence has made GMG stronger, more robust and even more determined to ignite change in our industry.

Part of this success can be attributed to an amazing staff and Executive Council that brought years of experience to the table. But GMG would not be what it is today without the dedication of its growing membership. We have always and will continue to make it a priority to engage and listen to members as GMG is your organization.

I am certain that the future will continue shining even brighter as GMG forges ahead. It is in this light that I am excited to be passing along the torch to my colleague Kalev Ruberg as GMG’s next Chair. I have had the pleasure of working closely with him over the last few years and I am confident that his experience, expertise and leadership will lead to new achievements and expand GMG’s reach even further.

My time as Chair has been an amazing journey and I would like to extend my sincere thanks to the entire global mining community for their tireless work and support — it has truly meant a lot to me. As I now become past Chair, I look forward to continuing my work with many of you for years to come towards creating a safer, more sustainable future for mining.

Take care and see you soon,
Michelle
The collaboration with other organizations and its ability to serve the industry is key to GMG – and that is what we are here for. This benefits the industry as we do not duplicate others’ efforts, rather we complement these or join forces. A challenge, however, given our broad nature, is to maintain scope and focus while serving the needs and addressing the priorities of our members around the world.

Our Values
As an industry where resources are in areas where different languages are spoken, we must increase our capability to communicate globally – which is a challenge. Respecting diversity is a cornerstone of GMG and within the industry, and we will continue to make sure that GMG embodies this principle.

The Planet
The planet is threatened by human activity and how it is affecting climate, soil, flora, and water. These effects further impact our communities and how we live together. Sustainable mining endeavours to balance the need for critical resources to ensure the quality of life, while having the lowest possible impact on our planet.

The notion of solutions to sustainable mining being the same everywhere is certainly questionable; there are areas that can rely on some renewable energies, and many areas that cannot. The potential of alternative sources of electricity must be understood as part of the energy supply chain and the technical guidance on what is possible where it is critical. Regional capabilities, particularly on the sustainability side, and technical guidance on what is possible and case studies are often the most powerful mechanisms to drive innovation into operations.

Innovation
The innovation process really looks at breakthroughs, and these breakthroughs tend to emerge from a relatively well-defined process model of basic principles that drive evolution in nature, and in many ways, that is GMG. Many of the processes that we have or put in place reflect that.

It is iterative search and experimentation and selection, and while it relies on exceptionally talented people, which we have, it does not require the necessary Leonardo Di Vinci or Steve Jobs to produce that breakthrough innovation. In fact, we have shown that repeatedly.

The community now, more than ever, needs this kind of information and technical competence given the accelerated challenges for 2030 and 2050 set by the Paris Accords of 2030, and we need to maintain GMG’s technical niche within that global ecosystem that is working towards solutions.

Our History and Future
Under Michelle’s leadership, GMG grew its brand recognition globally – we will continue those efforts.

One of the concerns raised by our members is that our publications do not proceed quickly enough. Though our signature processes are in place to ensure quality guidance, we will look at options for publishing quicker. One example could be publishing sections of guidelines while the whole is being worked on.

We also have a fantastic opportunity to work more closely with academia – making sure they are part of the GMG community as well as supporting them in their efforts. This collaboration for “peer review” will serve the industry well as we move forward.

Although our new bylaws are well formed, they must remain fluid. If there are things that need to be changed to keep providing value to the industry, I encourage members to bring them up at the annual general meetings.

I am excited to be taking the reigns over from Michelle as your Chair. Under her leadership and guidance, GMG grew in members, participants, and global recognition. I endeavour to keep those efforts going and ensure GMG is a valuable organization where collaboration and innovation are fostered.

My warmest regards,
Kalev Ruberg, GMG Chair
From December through the end of March was an intense period of consultation with our community to help set the course for GMG over the coming years. Thank you to everyone who took the time to give input and feedback about GMG and our focus areas. GMG is YOUR organization -- its strength, value and success are thanks to you.

The next step will be to develop a robust 3-year plan for global growth and for GMG to scale and deliver even more value to the industry.
OPERATIONAL BRIEFING

This has been a hectic year so far, and here at GMG it’s been rich with critical discussions, new connections, and strategy development. I’m excited for GMG’s future. We have an incredible team. Our working group steering committees represent a broad range of industry leaders with deep knowledge of their fields. The GMG leadership structure, including the Executive Council, Governance Committee, and Leadership Advisory Board, have demonstrated their commitment to a strong GMG and are guiding us to ensure we have sound governance and processes in place and that we are focused on the critical areas that will bring value to our industry. And the GMG Team, including our fantastic staff and incredible volunteers, are committed to keeping us focused on enabling collaboration and delivering value. I thought I’d take a moment to share some highlights of the past few months, and to reach out with some areas where we are seeking leadership from our members:

**AI WORKING GROUP** The working group published the Open Data Set for AI in Mining guideline, and already we’ve received positive feedback and a surge of interest to continue the work towards enabling access to open data sets to support innovation.

**AUTONOMOUS MINING WORKING GROUP** Multiple project areas are underway in this working group:
- version 2 of the Implementation of Autonomous Systems guideline
- bringing together a committee of experts towards the creation of a System Safety guideline
- supporting the ISO TC82/SC 8 work
- a project group looking at zero-entry mining
- a small equipment autonomy white paper

**DATA EXCHANGE FOR MINE SOFTWARE** This project committee has confirmed that the Open Mining Format version 3 is to be published within the coming months, pending a final review workshop. One question remains about whether a C++ version will be required. The group will be seeking strong mining company input to define the next priorities for the project.

**MINERAL PROCESSING WORKING GROUP** The Industrial Comminution Efficiency sub-committee of this working group is close to completing a minor revision of the Methods to Survey and Sample Grinding Circuits for Determining Energy Efficiency guideline.

**DECARBONIZATION** A decarbonization priorities workshop held in Vancouver in early May – our first in-person workshop in almost 2 years – was an outstanding day. I’ve received feedback from many participants that it was one of the highest value events they had been to... in years (not just Covid years!). The group identified 4 priority areas for further collaboration:
- transitioning the mining fleet with a focus on the data requirements
- carbon capture and carbon sequestration
- enabling the implementation of emerging and new technologies
- and small modular reactors.

A series of roundtables and other regional workshops are on this year’s calendar to enable more participants to contribute and to continue to advance the work for the Sustainability working group.

**ELECTRIC MINE WORKING GROUP** The Working Group published the much-awaited Recommended Practices for Battery Electric Vehicles in Underground Mining - Version 3. The steering committee has a mini project underway to identify and compare priorities – for surface and underground – seeking to highlight commonalities and help define the working group’s project plan.

**UNDERGROUND MINING WORKING GROUP** The group had a workshop in Sudbury in June to seek input on project areas to prioritize and to build a project roadmap. Participants identified 4 priority areas:
- Battery swapping vs opportunity charging
- Autonomous mining
- Continuous mining for hard rock
- Interoperability and telemetry

Similar activities were announced to enable participation from underground mining experts globally.

That’s not all! The GMG Governance Committee, with the generous participation of a sub-committee of dedicated volunteers, developed our new bylaws. At our AGM we announced the new board of directors – we had a wealth of top-notch candidates. It was not an easy ballot to cast, I’m sure!

Check our website and your Inbox for a full calendar of events running through the end of the year. There is lots of opportunity, both in-person and virtually, for our community to collaborate, share expertise, and contribute to the development of the next guidelines and white papers that will be published. Our members participate in GMG events and share your expertise – please contact me if you’d like to provide a presentation this year – case studies and demonstrations are the tops!

See you soon, Heather
WORKING GROUPS

Working Groups operate as communities of interest, giving members the opportunity to share their insights and voice their concerns in response to current industry needs and priorities. They act as a hub for collaboration and information sharing towards improving industry practices, advancing guidance, and developing innovative solutions for years to come. All members are welcome. Our nine Working Groups are detailed below.

ASSET MANAGEMENT

This group is an inclusive and global operator-driven community of interest whose primary purpose is to identify and share leading practices in asset management, reliability, and maintenance. The group is dedicated to developing asset management guidelines that result in improved safety, ESG, and operating performance for the benefit of the mining industry.

PROJECTS AND ACTIVITIES

FRAMEWORK AND ROADMAP

This activity aims to provide a clear summary of different aspects of the asset management field and how they integrate. It aims to provide the Asset Management Working Group with a clear path forward in terms of future projects and priorities. Once completed, this will be used by the Working Group to identify knowledge gaps and areas that will require the most work in order to move from reactive to proactive maintenance for mobile mining equipment.

CURRENT STATUS aiming to develop project plan intended for Q4

ASSET MANAGEMENT IN THE DIGITALIZED MINE

Following strong member request, work is underway to define critical opportunities and challenges to enable the use of data and systems for asset management.

CURRENT STATUS Roundtables scheduled in Q3-4

MM-ISAC/GMG CYBERSECURITY (JOINT)

This group aims to develop a culture of cybersecurity, facilitate awareness, and provide guidance for the global industry to enable secure and resilient systems and networks in the face of cybersecurity risks—such as risks include data breaches, system/equipment shutdown and hacking, phishing, infiltration through third-party access—that the mining industry faces when adopting sophisticated digital and integrated solutions.

PROJECTS AND ACTIVITIES

With a new leader at the helm of this steering committee, we are working to confirm other committee participants. The working group also provides cybersecurity support and advice to the other working groups, for example on the Implementation of Autonomous Systems guideline project, the Underground Communications Infrastructure project, and others.
ARTIFICIAL INTELLIGENCE

This group aims to facilitate a greater understanding of AI and its applications in mining and enable companies to adopt AI solutions safely and effectively. It also aims to identify the challenges associated with applying AI in mining operations and define long-term collaborative and innovative solutions in a rapidly advancing technological landscape.

PROJECTS AND ACTIVITIES

The Working Group Steering Committee met twice and discussed a continued focus on data for enabling AI and some potential next steps related to open data sets. They are currently in the process of developing a plan for forthcoming projects. In addition, a survey is now open to gather input from the community. Take it here.

RECENT PUBLICATIONS

GUIDELINE FOR SHARING OPEN DATA SETS IN MINING
(Published 2022-04-21)

The purpose of this guideline is to provide mining industry stakeholders with best practices for data sharing. The guideline leverages and references existing work on data sharing to provide context for mining. It is directed towards readers who intend to share data with others, those who are involved in the approval process, and users who want to use open data shared by the mining industry. Core sections are on on management considerations (benefits and business risks and license types) and implementation considerations (identifying data to be shared, extracting, and preparing data, anonymization, risk assessment, approval, and release, and making data sets open).

LANDSCAPE OF OPEN DATA SETS AND PLATFORMS
(Supplementary content published with the above Guideline for Sharing Open Data Sets in Mining)

A table of examples of organizations with open data platforms and references to specific data sets that are relevant to mining. This is intended to be a live document, suggestions for additions are always welcome.

MONITORING THE HEARTBEAT OF MINING AND METALS PRODUCTION CASE STUDY
(Published 2021-12-15)

A case study provided by Endress + Hauser about how Kanmantoo Copper Mine, owned by Hillgrove Resources in South Australia, used smart sensor technology to increase production potential by raising ROM bin capacities and reducing maintenance costs by reducing operator time on site.
SMALL VEHICLE AUTOMATION
As the adoption of autonomous systems in mining advances, small vehicle automation is growing more affordable and accessible. Small size autonomous haul trucks can be an option for different types of operations (e.g., quarries, small-scale mining operations) that do not use large mining-scale haul trucks or for large operations that are looking to automate their smaller equipment. It can also be an entry point for operations that are not ready for large-scale automation. There is also a growing diversity in vendors for smaller scale vehicles, which presents both opportunities and challenges.

The objective of this project is to publish a collaborative white paper that can help surface mines with the adoption of small size autonomous haul trucks (100 tonnes or less) by providing common considerations and increasing awareness of challenges and opportunities that are specific to them.

The project also includes the development of a landscape to observe work currently being done in closed mining environments in order to prevent overlap.

CURRENT STATUS The proposal was approved by the Working Group Steering Committee in April. A draft project plan has also been developed and a formal Project Steering Committee is being formed.

IMPLEMENTATION OF AUTONOMOUS SYSTEMS V2
This is a revision of the “Guideline for the Implementation of Autonomous Systems in Mining”, which was first published in 2019. It is intended to help mining companies and those working with them at various stages on the implementation journey to understand their maturity level, define their path forward, identify where to seek additional guidance and information, and build confidence in the technologies. Key topics covered include change management, business case, health and safety, regulatory engagement, workforce, community and social impact, and operational readiness and deployment.

Key updates identified for this version include:
- Making sure there is accurate consideration given to underground mining
- More consideration given to different types of autonomous equipment

CURRENT STATUS Seeking experts for the steering committee and participants to support the revisions.

SYSTEM SAFETY FOR AUTONOMOUS MINING
In 2021, GMG published the “System Safety for Autonomous Mining” White Paper, which gave an introductory overview of some system safety concepts to consider when introducing autonomous systems in mining. Now that the industry is becoming more advanced in this space, this new guideline project aims to provide more complete guidance on applying system safety to autonomous systems in mining.

CURRENT STATUS Current focus is on gathering subject matter experts to consider the focus and direction of this project.

ZERO ENTRY
Develop a comprehensive view of the requirements for deploying a zero-entry mining operation, including key risks and potential benefits; zero-entry mining maturity model; and impacts of zero-entry mining on technical services, maintenance and servicing, area inspections, etc.

CURRENT STATUS Workshops being held in Q3-4

CASE STUDIES A forthcoming case study on secure deployment of autonomous haulage systems is currently in the author’s company approvals. Gathering case studies on various aspects of autonomous mining is also a priority of the Working Group.

STANDARDIZATION Official liaison organization status with ISO TC 82/SC 8 has been approved by ISO pending SC 8 member approval.
DATA & INTEROPERABILITY

This group (a proposed new name for what was formerly the Data Access and Usage and Interoperability Working Groups, which merged in 2020) aims to address challenges that the industry faces related to data management, interoperability, and integration through work that supports and enables the industry common language, data quality, data exchange, data sharing, and data access.

PROJECTS AND ACTIVITIES

PROJECT

COMMON LANGUAGE FOR MINING TECHNOLOGY

Discussions within the community have highlighted the need for common language for data and integration. The purpose of this project is to determine and provide a common taxonomy (categorization, generic framework) and definitions for mining production capabilities (operating functions, processes) and application and control systems that support the production capabilities, primarily focusing on surface mining. It is intended to be forward-looking.

This categorization is intended to be a first step in understanding, which can be used to support and drive further conversations within GMG in a targeted way, identifying common system integration areas and issues, where further collaborative efforts are needed, and identifying what issues are industry-wide versus what should be left up to the individual operator and OEM relationships. Having this common language will also help operators, suppliers, and other parties communicate about their needs within determined boundaries.

CURRENT STATUS This project was approved to launch at the June Working Group Steering Committee meeting

PRE-RELEASE

DATA EXCHANGE FOR MINE SOFTWARE (OPEN MINING FORMAT)

The Open Mining Format (OMF) is an open-source serialization format and API library to support data interchange across the entire mining community. Version 1 (2017) supports basic structures including points, lines, surfaces, meshes and volumes. Version 2 (under development) extends support to block models, computer-generated representations of ore-bodies that contain valuable data about them.

CURRENT STATUS OMF 2.0 is in pre-release
THE ELECTRIC MINE

This group is a global community that aims to accelerate the adoption of all-electric technologies in mining, address the challenges associated with them, and share information on how they can enable safer, more efficient, productive, and cost-effective mines.

PROJECTS AND ACTIVITIES

RECENT PUBLICATION

RECOMMENDED PRACTICES FOR BATTERY ELECTRIC VEHICLES IN UNDERGROUND MINING – VERSION 3

Provides guidance and an overall discussion about the benefits, drawbacks, and planning requirements for designing and implementing a BEV fleet within an existing or new mine. This guideline covers the business case, mine design and operations, battery electric vehicle design, energy storage systems, charging systems and methods, types of charging and connection interfaces, and performance standards. Key updates since Version 2 include:

• New and expanded content on safety, risk, and emergency response, particularly related to battery fires and thermal runaway.
• New and expanded content on maintenance, including maintenance area design, charging system and maintenance, and equipment maintenance and service area design.

WORKING GROUP CURRENT STATUS

Events are being held in Q3-4 to gather input to develop a working group project plan.

OTHER ACTIVITY

COMPARISON OF SURFACE AND UNDERGROUND

A mini project to explore where there are commonalities and divergences between surface and underground mines and across the globe.” To be consistent with the operations briefing.

KNOWLEDGE SHARING

Projects on operational knowledge sharing and KPIs are still of interest, decisions on their relaunches to be confirmed.

SUSTAINABILITY

This Working Group aims to develop resources and foster collaboration on operationalizing sustainability, which refers to the process of making sustainability practical, implemented, measurable, technically applied, and integrated throughout operations. This group will focus on addressing a range of topics with a focus on best practices, guidance, strategies, and tools to enable incremental and short-term practical changes that will help to create more sustainable operations.

PROJECTS AND ACTIVITIES

The Working Group Steering Committee had their first meeting in June, focusing on developing the project plan. They agreed to launch a sub-group on decarbonization. The committee is continuing to work on a strategy for the group from the volumes of input we’ve received from the community.

SUB-GROUP

DECARBONIZATION

Workshops continue to be held to identify critical challenges and priorities to define project plans for this sub-group. Two topics of interest have been prioritized for further development and roundtable discussions will be held in Q3-4: small modular nuclear reactors and carbon capture and storage.
MINERAL PROCESSING

This group is a community of interest for operators, suppliers, subject-matter experts and other stakeholders with an interest to discuss and address community industry challenges relating to mineral processing. Topics include comminution efficiency, plant improvement and design, emerging technologies, metallurgical accounting, and testing procedures.

PROJECTS AND ACTIVITIES

GUIDELINE REVISION

METHODS TO SURVEY AND SAMPLE GRINDING CIRCUITS FOR DETERMINING ENERGY EFFICIENCY

This guideline covers surveying and sampling Autogenous Grinding (AG), Semi-Autogenous Grinding (SAG), rod, and ball mill circuits within the normal range of application. While the intent of this guideline is not to define a full grinding circuit survey procedure, the techniques described observe industry best practice and can provide a firm starting point to analyze mineral comminution circuits at any required level of detail. The guideline, originally published in 2016, passed through review. The outcome was that only minor revisions for clarity and context were required, and the revision committee is almost done finalizing the updated version. Republication is expected in the coming months.

RECENT PUBLICATIONS

DETERMINING THE BOND EFFICIENCY OF INDUSTRIAL GRINDING CIRCUITS

Republication, minor revision 2021-12-15

This guideline describes the Bond method for quantifying and comparing the relative energy efficiency of most industrial comminution circuits.

THE MORRELL METHOD TO DETERMINE THE EFFICIENCY OF INDUSTRIAL GRINDING CIRCUITS

Republication, minor revision 2021-12-16

The guideline reviews the data required for analysis including hardness characterization data generated from the SMC Test and the Bond Ball Mill Test Work Index, and the Morrell equations and their applications.
UNDERGROUND MINING

As underground mines are going deeper to meet increased demands and are innovating to improve communication, safety, and productivity, this group aims to identify and address common underground mining sector challenges and opportunities while considering the adaptability of the mine infrastructure and new and legacy technologies.

PROJECTS AND ACTIVITIES

GUIDELINE REVISION

UNDERGROUND MINE COMMUNICATIONS INFRASTRUCTURE

All three parts of the “Underground Mine Communications Infrastructure” Guideline Suite, published between 2017 and 2019, are now up for review by the Underground Mining Working Group. This review process is to assess whether revisions are required.

These guidelines are a three-part suite which aims to provide a high-level overview of the processes needed by mine personnel to meet planning and design requirements when creating or replacing underground mine communication infrastructure:

• Part I “Positioning and Needs Analysis” (2017) provides a general overview of the guideline objectives, audience, and a mine communications maturity lifecycle diagram.
• Part II “Scenarios and Applications” (2017) provides scenarios of practical applications in underground mining (e.g., applications for autonomous, semi-autonomous, and remote-control equipment and wireless sensors and communications networks).
• Part III “General Guidelines” (2019) is the core content of the guideline suite, providing the reader with an overview of the planning and design recommendations for underground communications development, some of the best practices used within mining environments, and where to find more information regarding digital communications, standards, and frameworks.

While only the first two parts are due for revision this year, reviewing the three guidelines together is the best way to ensure the most effective decisions are made to update the guideline suite as technologies are advancing quickly in this space.

CURRENT STATUS Review is ongoing, seeking industry experts to participate in the review.

PROJECT

UNDERGROUND REVIEW FOR IMPLEMENTATION OF AUTONOMOUS SYSTEMS

A key focus for version 2 of the Guideline for the Implementation of Autonomous Systems in Mining is making sure underground is represented.

CURRENT STATUS A review of the guideline from an underground lens is wrapping up with three workshops this month. The content required that will be identified will be developed throughout Q 3-4.
COMMUNITY GROWTH

Sharing information and forging relationships remain key for the continued advancement of the mining industry. GMG continues to expand globally, welcoming our newest members to the community.

LEADERSHIP

Accenture • Anglo American • Aurecon • BHP • Caterpillar • Codelco • Epiroc • Glencore • Komatsu • METS Ignited • Orica • Rio Tinto • Teck • Vale

COLLABORATOR

ABB • Amazon Web Services • Antofagasta Minerals • BBA • Boliden • Enaex • Hatch • IBM • Imerys • Ivanhoe Electric Inc. • Ma’aden • Newmont • OZ Minerals • Schneider Electric • Seequent • Sibanye-Stillwater • South 32 • Suncor

GENERAL

3D-P • Agnico Eagle • Airth.io • Alamos Gold • Alcoa • Autonomous Solutions (ASI) • AVEVA • Beijing ROCK-AI Autonomous Driving Technology • Black Swan Metallurgy • Capstone Mining • Cepion • CheckMark Consulting • China ENFI Engineering Corporation • CITIC Pacific Mining • Cordoba Minerals • Dassault Systèmes • Datamine Software • De Beers • Deswik • EELO Solutions • Endress + Hauser Group • Enviro Integration Strategies • Ero Copper • Flow Partners • Fortescue Metals Group (FMG) • Freeport-McMoRan • Global Physical Asset Management • Gold Fields • Hexagon • Hitachi • Iamgold • Imex Limited • Immersive Technologies • Imperial • Kal Tire • Kirkland Lake Gold • Liebherr • MacLean Engineering • Magotteaux • Maptek • McGill University • Metcom Technologies • Micromine • Miller Technology • MineWare • Mining Plus • Mining3 • MMG • Modular Mining Systems • Mosaic • Motorola • MST Global • New Gold • Off-World • Opencontour • OSssoft • Peck Tech • PETRA Data Science • Rithmik Solutions • Rokion • RPM Global • RWTH Aachen University • Saminco International • Sandvik • Senseye • Siemens • SMART Systems Group • SMS Equipment • SRK Consulting • SSR Mining • Stäubli • Strayos • Symbiotic Innovations • Syncrude • Tellus Mining • Thermo Fisher Scientific Inc. • Thiess • TiMining • Torex Gold Resources Inc. • Uptake • Volvo • VRB Energy • Wabtec Digital Mine • Willow Inc. • Worldsensing • XMPro

MEMBERSHIP AND PARTICIPANT GROWTH

![Diagram showing membership and participant growth from 2012 to 2022](image-url)
## FINANCIALS

Global Mining Guidelines Group  
November 15 – December 31, 2021

<table>
<thead>
<tr>
<th>TOTAL</th>
</tr>
</thead>
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</tr>
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</tr>
<tr>
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</tr>
<tr>
<td><strong>Total Income</strong></td>
</tr>
</tbody>
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| **EXPENSES** |
| Administration | $ 43,584.61 |
| Staff | $ 64,323.94 |
| Events | $ 268.75 |
| Membership | $ 9,295.76 |
| Outreach | $ 3,268.75 |
| Working Groups and Projects | $ 13,983.48 |
| **Total Expenses** | **$ 134,725.29** |

| **OTHER EXPENSES** |
| Exchange Gain or Loss | - $ 4,391.71 |
| Reconciliation Discrepancies | - $ 204.27 |
| **Total Other Expenses** | **$ 4,595.98** |

| **NET INCOME** | **$ 113,589.39** |
| Closing bank balance December 31, 2021 | **$ 534,119.74** |