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EXPANDING OUR GLOBAL REACH

Since September we have been busy hosting many productive events and workshops, launching a new project and a working group, and reaching important milestones in existing projects.

GMG holds events around the world to ensure each region’s voice is heard and expertise is shared to the benefit of the global mining community. In 2018 we held five forums, 32 workshops and more than 300 working group calls. In recent months, our Edmonton Forum, held in partnership with CIM in October, was a great success in terms of attendance, participation and feedback. Last month I attended and participated in the GMG Leadership Summit held in Perth and was impressed at the diversity of topics from inside and outside our industry. The GMG team also headed to Santiago to host a forum, with our partners focused on driving interoperability.

In line with the publication of Version 2 of the Battery Electric Vehicles guideline we held our first BEVs Short Course in Perth, where BEV project leaders brought their expertise to a new region, even giving participants a real-time tour of the charging bay at Kirkland Lake Gold’s Macassa mine in northern Ontario. Thank you to the BEV working group, project participants and collaborative organizations for your work and support on Versions 1 and 2 of the BEV guideline. These projects are perfect examples of the power of collaboration, only made possible because of a group of dedicated volunteers.

Our membership continues to grow as we expand our global reach into new areas such as India and Saudi Arabia. This quarter, we welcome seven new members to the GMG community – Vedanta, Ma’aden, Sibanye-Stillwater, CITIC Pacific Mining, Iamgold, Imperial Oil and PETRA Data Science – now totalling 86. It was wonderful to see some new members already participating in our events and projects and adding new perspectives.

As 2018 comes to an end, I would like to thank our members and the 2,100+ who participated in our working groups, projects and events for your openness and collaboration and the fresh perspectives you bring. And thank you to our sponsors and network of 30+ collaborative organizations whose support has helped enhance our events this year.

In 2019 we will continue our efforts to reach underrepresented areas around the globe such as South America, Africa and Asia. We are in the process of confirming dates for events, including a few short courses in the first half of the year, in those regions and others as you’ll note in the calendar on p8.

The year will start off strong with the publication of six new guidelines in Q1. I’m excited to watch developments of our recently launched Artificial Intelligence in Mining working group and Functional Safety for Autonomous Equipment project.

With many exciting new initiatives in the works, we will continue to drive change for the global industry.

I wish you and your families a safe, happy and prosperous New Year. Cheers!

Michelle Ash
Chair, GMG
GMG EVENTS IN Q4
Implementation of Autonomous Systems Workshop, Perth
Leadership Summit, Perth
Blockchain Panel, Leadership Summit, Perth
BEV Short Course, Perth
Functional Safety Workshop, Perth
AI Workshop, Perth
Leadership Summit, Perth
NEW AT GMG

Artificial Intelligence Working Group Created

In November, GMG launched a new Artificial Intelligence Working Group to help demystify AI and enable the mining industry to harness its many valuable applications. This working group intends to create a greater understanding of AI and its applications in mining and promote increased openness to enable companies to adopt AI technologies safely and effectively. It will be a community of interest on the topic, bringing together operators, AI experts from inside and outside the mining industry, and other mining stakeholders.

At the launch workshop, hosted by IBM on November 8 in Perth, Australia, participants made considerable progress towards defining the first project. The key objectives include:

- Education: Clarify what AI and ML are (and are not), provide common terminology
- Applications (use cases): Documented qualitatively and quantitatively successful applications, reflect on parameters of ROI, identify failures where appropriate
- Accessibility: Provide clarity about requirements for AI deployments

The first conference call, held on December 11, confirmed project basics. The group is working to deliver the first project by May 2019. The next workshop is planned for February 11, 2019 in Denver.

New GMG Global Testbed Network Program

GMG is in the process of defining the Global Testbed Network program framework. This initiative grew out of requests from many member companies for a platform that brings innovators together to share information for the industry’s collective benefit. Testbeds are demonstration platforms used to test new and innovative technologies, products and services. While testbeds are used for research in many settings, this initiative will focus on testbed projects in operational mines that are intended to be scaled up for larger deployment. Many mines are now using testbeds to help introduce increasingly complex technological solutions, but there is little consistency in practices. This new program aims to meet this growing need for more consistent and connected testbed practices while also providing a concrete method of validating and enhancing GMG guidelines.

The GMG Global Testbed Network Program’s initial priorities are to:

- Develop the framework and governance of the network to enable sharing of information.
- Recruit mining companies as testbed participants and identify innovative projects that align with GMG values.
- Develop a methodology for completing testbed projects and presenting results that drives efficient mining innovation and can be used to validate GMG guidelines.

Marcus Thomson has joined the GMG management team as Program and Business Development Manager for this project. Marcus brings a wealth of experience in program management and business development and specializes in introducing digital innovation to the mining industry. He has also been an active GMG collaborator who has made valuable contributions to several working groups and guidelines.

There are many ways to participate in this initiative. We will be looking internally to establish a steering committee and project evaluation committee comprising of those who have been involved in the working groups and can ensure the work plan and projects align with GMG values. We will be also be looking to mining companies to propose projects that could test GMG guidelines. Participation and input from academia, the private sector, government, and industry associations will also be needed.
Version 2.0 of BEVs Guideline Published

GMG published the second version of Recommended Best Practices for Battery Electric Vehicles in Underground Mining (BEVs) Guideline in partnership with Canada Mining Innovation Council (CMIC). This second edition adds valuable context to the first edition, and updating it to reflect recent technological changes. It includes a new section on operations and introduces new material to help those creating a business case for BEVs. The new version also expands the existing charging section.

Just after publishing in early November, GMG also hosted a short course in connection with the leadership summit in Perth, Australia. It featured presentations from MacLean Engineering, Miller Technology, ABB, Bestech, Artisan Vehicle Systems, and a live streaming presentation at a charging bay underground at the Kirkland Lake Gold Macassa mine complex.

Two more short courses are planned for 2019 – the first in February, associated with the SME annual conference in Denver, Colorado, U.S.A., and the second in April, as part of the CIM Convention in Montreal, Quebec, Canada. Registration will open shortly.

Also new to the GMG Team

With a full schedule of events and many guidelines going to print within a 6-month period, Francine Harris is helping our team meet our growing needs for research, technical editing and writing. We’re thrilled to have her on the team!

Functional Safety for Autonomous Equipment Project Launched

The Autonomous Mining Working Group launched a new project on functional safety for autonomous equipment. It comes at a critical moment: the mining industry is embracing mobile automation technologies, but they are still in the early stages of development and there lacks clear guidance and industry alignment on requirements for managing functional safety. This project’s objective is to offer this guidance and alignment by developing a guideline for standards to use and creating a common understanding and approach to application.

There is already outstanding support from the industry. The project committee’s kick-off workshop on October 8 in Perth brought together a diverse group of stakeholders who identified priorities. The new project committee held the first conference call on November 29, which had 48 attendees, to confirm the project plan.

The project’s first phase is underway, beginning with work to develop a content plan. Stay tuned for more information about the first workshop, planned for early- to mid-February. See page 14 for details.
### 2019 EVENTS

#### FEBRUARY
- **24-27**
  - GMG Exhibiting at SME 2019
    - Denver, CO, U.S.A.
  
  - Ironing out dates for:
    - Battery Electric Vehicle Short Course at SME 2019
      - Denver, CO, U.S.A.

  - AI in Mining Workshop
    - TBC

  - Functional Safety Workshop
    - TBC

#### MARCH
- **20-21**
  - Secure and Integrated Energy and Mining Systems Forum
    - Adelaide, Australia

- **27-28**
  - GMG Forum: Luleå
    - Luleå, Sweden

  - AI in Mining Workshop
    - TBC

  - Global Testbed Network Steering Committee Meeting
    - TBC

#### APRIL
- **2-3**
  - GMG Forum: Johannesburg
    - Johannesburg, South Africa

- **28**
  - Battery Electric Vehicles Short Course at CIM 2019
    - Montreal, Quebec, Canada

- **28**
  - Autonomous Mining Short Course at CIM 2019 (in collab. with the Gov of Ontario)
    - Montreal, Quebec, Canada

#### MAY
- **1**
  - GMG-CIM Forum: Artificial Intelligence in Mining
    - Montreal, Quebec, Canada

- **22-23**
  - GMG Forum: Tucson
    - Tucson, Arizona, U.S.A.

#### JUNE
- **12-13**
  - GMG-CIM Forum: Sudbury
    - Sudbury, Ontario, Canada

  - Annual General Meeting and Networking Event
    - Montreal, Quebec, Canada

- **30**
  - Leadership Council Meeting
    - Montreal, Quebec, Canada

#### JULY
- **12-13**
  - GMG-CIM Forum: Sudbury
    - Sudbury, Ontario, Canada

  - Autonomous Mining Workshop
    - Johannesburg, South Africa

  - Autonomous Mining Workshop
    - Perth, Australia

  - Autonomous Mining Workshop
    - Edmonton, Alberta, Canada

  - Autonomous Mining Workshop
    - Sudbury, Ontario, Canada

  - AI in Mining Workshop
    - TBC

  - Underground Communications Working Group Lunch Meeting
    - Montreal, Quebec, Canada

#### AUGUST
- Ironing out dates for:
  - GMG Forum: Perth
    - Perth, Australia

  - GMG Forum: Bowen Basin
    - Bowen Basin, Australia

#### OCTOBER
- **22-23**
  - GMG Leadership Summit
    - Tucson, Arizona, U.S.A.

  - Leadership Council Meeting
    - Tucson, Arizona, U.S.A.

  - Ironing out dates for:
    - GMG-CIM Forum: Edmonton
      - Edmonton, Alberta, Canada

#### NOVEMBER
- Ironing out dates for:
  - GMG Forum: India
    - Rajasthan, India
## Leadership Tier

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*New this period*

| Vedanta |

## Collaborator Tier

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*New this period*

| Ma’aden | Sibanye-Stillwater |

## General Tier

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GOVERNING COUNCIL

CHAIR
Michelle Ash, Chief Innovation Officer, Barrick Gold

OUTGOING CHAIR
Helius Guimaraes, Digital Transformation Leader, Alcoa

VICE-CHAIR WORKING GROUPS
Andrew Scott, Principal Innovator, Symbiotic Innovations

VICE-CHAIR INTERNATIONAL STANDARDS
Tim Skinner, President, SMART Systems Group

TREASURER
TBD

SECRETARY
Peter Becu, Information Systems and Technology Consultant

MANAGING DIRECTOR
Heather Ednie, Global Mining Guidelines Group

ARTIFICIAL INTELLIGENCE WORKING GROUP LEADER
Mark O’Brien, Manager - IS Solutions Delivery, CITIC Pacific Mining

ASSET MANAGEMENT WORKING GROUP LEADER
Zoli Lukacs, Advisor, Asset Optimization

AUTONOMOUS MINING WORKING GROUP LEADER
Graeme Mitchell, Manager, Mine Automation, BHP Billiton

COMMON REFERENCE FRAMEWORK WORKING GROUP LEADER
Roy Irvine, Forum Director, Real IRM

INDUSTRIAL COMMINUTION EFFICIENCY WORKING GROUP LEADER
Aidan Giblett, Senior Technical Advisor, Newmont

INTEGRATED OPERATIONS WORKING GROUP LEADER
Laura Mottola, President and CEO, Flow Partners

INTEROPERABILITY WORKING GROUP LEADER
Marcelo Mosquera Zingoni, Deputy Director of Industrial Digitization and Advanced Manufacturing, CORFO

UNDERGROUND MINING WORKING GROUP LEADERS
Riaan Van Wyk, Chief Technical Officer, DetNet South Africa & Russell Kennett, Principal Engineer – Underground Technology & Systems, Rio Tinto

LEADERSHIP COUNCIL

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AMY CALLAHAN
Managing Director, Accenture

LIV CARROLL
Senior Principal, Analytics, Digital Mining, Accenture

HELIUS GUIMARAES
Digital Transformation Leader, Alcoa

ALEX KENT
Vice-President, Engineering and Projects, AngloGold Ashanti

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ANDREW SCOTT
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SAMANTHA, ESPLEY
Director, Technical Excellence, Vale

BARUN GORAIN
Chief Technology & Innovation Officer, Vedanta Resources
WORKING GROUP PROJECTS
The Asset Management Working Group is an operator focused group with global reach. The purpose of the group is to identify and share best practices in maintenance, reliability and life asset cycle management. The objective is to establish a set of guidelines for world class reliability practices applicable to mining and create a community of interest for the sharing of knowledge related to asset management in mining. The role of the group is to identify leading practices to improve asset safety and reliability, increased equipment runtime, improved production and lower operating cost.

TWO PROJECTS ARE UNDERWAY:

- **SMART Benchmarking Program**: The use of Key Performance Indicators (KPIs) and benchmarking practices are by far not new concepts. However, by the mid-1990s companies such as Syncrude and Suncor had started asking for a trustworthy system in order to effectively analyze data and measure performance. In response, the SMART Benchmarking Project was launched to establish a global database of mining equipment metrics related to cost and productivity. With the close of SMART, the program has fallen under the purview of GMG.

- **ISO TC 251 - Asset Management**: The Reliability Working Group subcommittee was formed, in part, to bridge the mining industry with the work of ISO TC 251 – Asset Management, specifically the ISO 55000x standards series. The standards series is a global asset management systems tool to identify common practices that can be applied and utilized in the broadest possible range of industries, organizations and cultures. An update on the project is provided later in this report.
This guideline is a universal roadmap for mining automation and integration that prepares companies to readily and effectively adopt and integrate systems and new technologies. It aims to prevent patchwork implementation processes that cause misaligned systems to hamper effective communication.

**PROJECT DASHBOARD**

- **Meeting Activities at a Glance**
  - 13 Teleconferences
  - 9 Workshops

**PROJECT TIMELINE**

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**Project Timeline**

- 1 – Project plan development
- 2 – Completion of a first draft
- 3 – Working Group review and approval
- 4 – Guideline publication

**GROUP LEADERS**

Glenn Johnson, Teck and Chirag Sathe, BHP

**164 PARTICIPATING COMPANIES**

3D-P, ABB, ACCENTURE, ADRIA MANUFACTURING INC., ALMA DE PAPEL, AMAZON, AMDAD, AMSA, ANGLO AMERICAN, ANGLOGOLD ASHANTI, ANTOFAGASTA MINERALS, ANTCUCOYA MINE, APPLIED MINING TECHNOLOGIES, ARIGAL, AUSTROBOTS, AUTONOMOUS SOLUTIONS, AVST CONSULTING, BARRICK GOLD, BATCHFIRE RESOURCES, BBA, BESTECH, BHP BILLITON, BLAST MOVEMENT TECHNOLOGIES, BLUWRAP, BMT, CAPSTONE MINING CORP, CATERPILLAR, CEMENTATION, CEMI, CF MINING, CHECKMARK CONSULTING, CITIC PACIFIC MINING, CODELCO, COMPAÑÍA MINERA ZALDIVAR, CONTAC, CORFO, DASSAULT SYSTEMES, DE BEERS, DEPARTMENT OF MINES AND PETROLEUM (DMP), DMC MINING, EPIROC, ERDENES MONGOL LLC, ETF MINING EQUIPEMENT, EYE3, FARELLONES INGENIERIA, FINNING, FLANDERS ELECTRIC, FLOW PARTNERS, FORTESCUE METALS GROUP (FMG), FREEPORT-MCMORAN, FUNDACION CHILE, GEOLAST, GLENCEORE, GLOBAL RESEARCH, GOLD FIELDS, GOLDCORP, GOVERNMENT OF ALBERTA, GVMAPPER, HAULTRAX, HEXAGON MINING, HOMER SIMSMART TECHNOLOGIES, IAMGOLD, ICONO ADVISORY, IKKUNA, IMAGOSOFT, MINEROS, IMPERIAL OIL, INDIMIN, INTERSYSTEMS CHILE & LATAM, ITI SOLUTIONS, JVA, KINROSS GOLD, KOMATSU, KOUCHI, LARRAIN Y SALAS, LIEBHERR, LTMT CONSULTING, MACLEAN ENGINEERING, MAPTEK, MCKINSEY, MINEMAPS, MINERA YANACOCHA, MINENWEN, MINISTRY OF ENERGY AND MINES, MINISTRY OF LABOUR, MINISTRY OF NORTHERN DEVELOPMENT AND MINES, MITSUI MINERALS RESOURCES, MODULAR MINING SYSTEMS, MOHAMED 6 POLYTECHNIC UNIVERSITY, Mosaic, MST GLOBAL, MTGA, NATURAL RESOURCES CANADA / GOVERNMENT OF CANADA, NEVSUN RESOURCES, NEWMONT, NIOSH, NUEVA UNION, NUTRIEN, OFF WORLD, ONTARIO MINISTRY OF LABOUR, OP3 CONSULTING PTY LTD, OPTIMAL MINING SOLUTIONS, ORICA, ORIGIN, OSISOF, PALARIS AUSTRALIA, PARTNERS IN PERFORMANCE, PECK TECH, PROTAB, PROUDFOOT CONSULTING, QUEEN’S UNIVERSITY, RCT, REAL IRM, RIGID ROBOTICS, RIO TINTO, ROCKFORD ENGINEERING WORKS, ROCK-TECH, ROCKWELL AUTOMATION, ROY HILL, RPM GLOBAL, SANDVIK, SHYFT, SIBANYE-STILLWATER, SIEMENS, SITECH, SKYMINEUAV, SMART SYSTEMS GROUP, SMM GOLD COTE, SMS EQUIPMENT, SRK CONSULTING, SSW MINING, ST COMPUTACION, STANTEC, STRATA WORLDWIDE, STRATEGY FOCUSED INNOVATION, SUNCOR, SYMBIOTIC INNOVATIONS, SYNRADWEST, TECK, TELETRAC NAVMAN, THIERS, TOREMEN COAL, TRELLEBORG, TRIMBLE, TRUST JOURNEY, UNIVERSAL FIELD ROBOTS, UNIVERSITY MAYOR, UNIVERSITY OF ALBERTA, UNIVERSITY OF BRITISH COLUMBIA, UNIVERSITY OF QUEENSLAND, UNMANNED AERIAL SERVICES, UPTAKE, VALE, VIRTUAL BUSINESS LINKS, VIST GROUP, WHITEHAVEN COAL, WSP MINING, YOURPACE
AUTONOMOUS MINING

Functional Safety of Autonomous Systems

International standards applicable for mine autonomy are not clearly defined and hence, requirements for managing functional safety are unclear.

PROJECT OBJECTIVES
» Develop a guideline for managing functional safety for automated mobile mining equipment
» Clarify the standards to use to provide OEMs as well as operators a common platform to manage functional safety
» Deliver a guideline with a list of standards for various aspects of automation of mobile mining equipment

PROGRESS
» Held a workshop and conference call
» Project participants are building the content

PLAN
PHASE 1:
» A guideline with a list of standards for various aspects of automation of mobile mining equipment
• Lifecycle and process for the different types of stakeholders including the accountabilities and responsibilities (key aspect: safety analysis)
• Expectations of a Functional Safety Management Plan and ownership
» A White Paper on the common purpose of the standards including their constraints
» Provide an industry platform for sharing of lessons from near misses to provide better risk management

PHASE 2:
» Guideline development:
• Common Competency Management Framework for Functional Safety
• Cross Acceptance process for certification of systems or applications
• Use of risk tolerance criteria
• Operators expectations, assurance documentation requirements, including for OEM to meet safety duty of care while ensuring IP is maintained
• Standard set of safety functions and expected parameters that would influence the safety integrity and performance requirements

PROJECT DASHBOARD

PROJECT PERFORMANCE
90%

STAKEHOLDER ENGAGEMENT
90%

PROJECT TIMELINE

1 – Phase 1 guideline draft and white paper
2 – White paper development
3 – Phase 2 guideline draft

GROUP LEADERS
Gareth Topham, Rio Tinto and Chirag Sathe, BHP

31 PARTICIPATING COMPANIES
ABB, ALEX ATKINS & ASSOCIATES, BHP BILLITON, CADIA VALLEY OPERATIONS, CALIBRE GLOBAL, CATERPILLAR, CITIC PACIFIC MINING, CSA GROUP, EPIROC, FINNING, FORTESCUE METALS GROUP (FMG), HAULTRAX, HITACHI, IMPERIAL OIL, KOMATSU, LIEBHERR, MACLEAN ENGINEERING, MARCUS PUNCH PTY., MINISTRY OF ENERGY AND MINES, NIOSH, PHOENIX CONTACT, RCT, RIVOS, RIO TINTO, SANDVIK, SAP ASIA, SCANIA, SCHNEIDER ELECTRIC, SMS EQUIPMENT, STANTEC, SYMBIOTIC INNOVATIONS

14 | GMG CORPORATE MEMBER REPORT DECEMBER 2018
The Open Mining Format will eliminate the time required for manual and convoluted data transfer across the mine site. It aims to enable different information technology systems and software applications to connect, communicate, exchange and apply data across the mine.

**PROGRESS**

» Engaging more software companies
» Have identified data types for version 2.0 of OMF. Now focusing on block models
» Dassault’s Surpac 2019 and 3DEXPERIENCE support the OMF platform since November
» An OMF user’s guide was developed

**PROJECT DASHBOARD**

**PROJECT TIMELINE**

1 – OMF V1.0 launch
2 – OMF use case report publication
3 – OMF V2.0 development
4 – Partnership agreements
5 – Survey

**65 PARTICIPATING COMPANIES**

ACQUIRE TECHNOLOGY SOLUTIONS, AGILEGEOSCIENCE, ALFORD MINING SYSTEMS, ANGLO AMERICAN, ANGLOGOLD ASHANTI, ARCELORMITTAL, AUSTMINE, AVEVA, BARRICK GOLD, BHP, CANADIAN NATURAL RESOURCES, CHECKMARK CONSULTING, CIM, DASSAULT SYSTÈMES, DATA MINE SOFTWARE, DESERT FALCON CONSULTING, DESWIK, EPIROC, FLANDERS ELECTRIC, FLOW PARTNERS, FREEPORT-MCMORAN, GEOMODELR, GEOSOFT, GLOBAL IO, GLOBAL MINING DESIGN, GOLDCORP, HEXAGON MINING, IBM, IGS (INTERNATIONAL GEOSCIENCE SERVICES), IMAGO, JVA, KINROSS GOLD, LOCKHEED MARTIN, MACLEAN ENGINEERING, MAPEK, MASTERCONTROL, MICROMINE, MINEVISION SYSTEMS, MINERA YANACOCHA, MINERP, MINESENSE TECH, MINING INFORMATION SYSTEMS, NEWMONT, OBJECTIVITY, ORICA, OSISOFT, PBE GROUP, PEABODY ENERGY, PRAIRIE MACHINE & PARTS, RIO TINTO, ROCKWELL AUTOMATION RPM GLOBAL, SEEQUENT, SIBANYE-STILLWATER, SIEMENS, SSR MINING, SYMBIOTIC INNOVATIONS, TECK, TRACKVIA, TRIMBLE, UNIVERSITY OF QUEENSLAND, VALE, VERTEX BLAST, VUMA 3D, WIPRO
To establish a common vision around the principles and guidelines for the permissible access and use of mobile equipment data across the mine cycle, including both open pit and underground, for the purpose of increasing safety, optimizing operational efficiencies and improving life-cycle management of physical assets.

**Mobile Equipment Open Data Consensus Version 2.0**

**PROGRESS**
- Draft complete
- Final review underway by Working Group

**PROJECT DASHBOARD**

**PROJECT PERFORMANCE**

- 70%

**MEETING ACTIVITIES AT A GLANCE**

- 3 TELECONFERENCES
- 1 WORKSHOPS

**PROJECT COMPLETION**

- 90%

**PROJECT TIMELINE**

1. Workshop
2. Draft development
3. Working Group review and stakeholder engagement
4. Guideline publication

**80%**

**STAKEHOLDER ENGAGEMENT**

**68 PARTICIPATING COMPANIES**

- ABB, AGNICO EAGLE, AMAZON, AMTC, ANGLOGOLD ASHANTI, ARCELORMITTAL, AUTOMATED SYSTEMS ALLIANCE, BARRICK GOLD, BHP CANADIAN NATURAL RESOURCES, CATERPILLAR, CHECKMARK CONSULTING, CMAC-THYSSEN MINING, DATAMINE SOFTWARE, DEPARTMENT OF MINES AND PETROLEUM (DMP), DESERT FALCON CONSULTING, DESWIK, EARTHSOFT, ENDEVEA, EPIROC, FOUNTAIN TIRE, FORTESCUE METALS GROUP (FMG), FREEPORT-MCMORAN, GE MINING, GIBRALTAR MINE, GLOBAL IO, HASTINGS DEERING, Haultrax, HITACHI, IBM, INNOVATIVE WIRELESS TECHNOLOGIES, JVA, KGHM INTERNATIONAL, KOMATSU, LIEBHERR, MACLEAN ENGINEERING, METS IGNITED, MICROZONE, MINERA YANACOCHA, NEWMONT, NEWTRAX, ORICA, OSIsoft, PBE GROUP, PEABODY ENERGY, PRAIRIE MACHINE & PARTS, RCT, RIO TINTO, ROY HILL, SANDVIK, SHELL CANADA, SIBANYE-STILLWATER, SMART SYSTEMS GROUP, SYMBIOTIC INNOVATIONS, SYMBOTICWARE, TECK, THE CYEST, THE ELECTRUM GROUP, UNIVERSIDAD DEL DESARROLLO, VALE, WENCO, WESTMORELAND COAL COMPANY
The guideline will identify events statuses and activities common to surface mining operations, provide guidelines for classification of activities into the Time Categories which make up the Time Usage Model, which in turn forms the basis for common operational KPIs.

**PROGRESS**

» Time Usage Model is complete and the descriptions are almost ready for publication.

**WHAT’S NEXT**

» The next phase is to identify and validate event triggers with dispatch system providers and identify participating mines willing to test the model under operating conditions.

**PROJECT DASHBOARD**

**PROJECT PERFORMANCE**

START          END

70%  60%  60%

**PROJECT TIMELINE**

1 – Circulate draft guideline
2 – Industry draft review and update
3 – Working Group review and approval
4 – Guideline publication

**GROUP LEADER**

Zoli Lukacs, Advisor, Asset Optimization

**38 PARTICIPATING COMPANIES**

3D-P, ACCENTURE, ANGLO AMERICAN, ANGLOGOLD ASHANTI, AVEVA, BARRICK GOLD, BHP, CANADIAN NATURAL RESOURCES, CENTRIC MINING SYSTEMS, CHECKMARK CONSULTING, DASSAULT SYSTEMES, DATA MINE SOFTWARE, DESERT FALCON CONSULTING, DESWIK, FLOW PARTNERS, FREEPORT-MCMORAN, GIBRALTAR MINE, GLOBAL IO, HEXAGON MINING, IBM, JVA, MINERA YANACOCHA, NEWMONT, OSISOFt, PEABODY ENERGY, PT UKI TECH INDONESIA, RIO TINTO, SIBANYE-STILLWATER, SIEMENS, SMART SYSTEMS GROUP, SSR MINING, SYMBIOTIC INNOVATIONS, TECK, THE ELECTRUM GROUP, TRIMBLE, UNIVERSITY OF SAO PAULO, WIPRO CONSULTING
This project provides a foundation and common guiding framework for the international mining industry to use to move forward with interoperability. It takes a broad approach to accommodate interoperability’s holistic role in enabling the seamless integration of mining systems and technology. It includes development of a universal roadmap to enable greater coordinated efforts and industry-wide alignment in achieving mining interoperability.

### Interoperability Definitions and Roadmap

The project involves the development of a universal roadmap to enable greater coordinated efforts and industry-wide alignment in achieving mining interoperability. The roadmap is intended to provide a foundation and common guiding framework for the international mining industry.

### PROJECT DASHBOARD

- **Meeting Activities At A Glance**
  - 7 Teleconferences
  - 12 Workshops

- **Project Completion**
  - Start: 0%
  - End: 80%

- **Project Performance**
  - 80%

- **Stakeholder Engagement**
  - 90%

### PROJECT TIMELINE

- **1 – Definitions and terminology development**
- **2 – Guideline development**
- **3 – Review**
- **4 – Publication**
- **5 – Phase 2 project plan development**

### 199 PARTICIPATING COMPANIES

These General Guidelines are the core content of the Underground Mine Communications Infrastructure Guidelines and are intended to provide 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. It includes some guidance on technical best practices, security management and remote operations.

**PROGRESS**

» Held workshops in Toronto, Johannesburg and Brisbane

» Ready for final review and vote

**PROJECT DASHBOARD**

**MEETING ACTIVITIES AT A GLANCE**

- **63** TELECONFERENCES
- **3** WORKSHOPS

**PROJECT TIMELINE**

1 – Project plan development
2 – Guideline draft development
3 – Review and approval
4 – Publication

**GROUP LEADERS**

Dave Fry, Granite Technology Group

**85 PARTICIPATING COMPANIES**

ABB, AGNICO EAGLE, AKROM, ALPHA TECHNOLOGIES, AMBRA SOLUTIONS, ANIXTER, AUSTROBOTS, AVEVA, BARRICK GOLD, BBA, BESTECH, BHP, CEMI, CHECKMARK CONSULTING, CISCO, DELOITTE, DESSERT FALCON CONSULTING, DETNET SOUTH AFRICA, DEXCENT, DRAEGER, ECM NETWORKS, EPIROC, FLOW PARTNERS, GLENCORE, GLOBAL IO, GRANITE TECHNOLOGY GROUP, GROUNDPROBE, HATCH, HEXAGON MINING, HINTEC, INNOVATIVE WIRELESS TECHNOLOGIES, IREDES, IVOLVE, JVA, KOMATSU, LAC DES ILES MINE LTD, LAIRD, LUNDIN MINING, MAESTRO DIGITAL MINE, METSTECH, MICROMINE, MINE VISION SYSTEMS, MINERA YANACOCHA, MINEPE, MINETEC, MOBILARIS, MOTOROLA, MST GLOBAL, NEWMONT, NEWTRAX, NHP ELECTRICAL ENGINEERING, NORTHERN LIGHT TECHNOLOGIES, NORTHERN STAR RESOURCES, ORBCOMM, PA SPATIAL, PBE GROUP, PRAIRIE MACHINE & PARTS, PSA INTEGRATION, RAMJACK, RAPIDBIZAPS, RCT, RIO TINTO, ROCKWELL AUTOMATION, RPM GLOBAL, SANDVIK, SOMIT, SIBANYE-STILLWATER, SIEMENS, STANTEC, STOCKDALES ELECTRIC MOTOR, STRATEGY FOCUSED INNOVATION, SYMBIOTIC INNOVATIONS, TECHNICAL UNIVERSITY OF MADRID, TELSTRA, TERRATIVE DIGITAL SOLUTIONS, TETHERCO, THYSSEN KRUPP, TOREX, TUNNEL RADIO, UNIVERSITY OF THE WITWATERSRAND, UNSW, VALE, WEST ARM CONSULTING GROUP, YAMANA GOLD, YOURPACE
This guideline will be a roadmap outlining possible paths from an “analog” mine to short interval control, a development necessary for creating best practices in shift time and use of assets in underground mines. Implementing this guideline will allow for better planning, quicker decisions, increased production and lower costs.

**Short Interval Control**

**PROGRESS**
- Project committee has approved the draft. Document is ready for layout and final review

**PROJECT DASHBOARD**

**Project Completion**
- End: 90%
- Start: 0%

**Meeting Activities**
- 70 Teleconferences
- 2 Workshops

**Project Performance**
- 75%

**Stakeholder Engagement**
- 75%

**PROJECT TIMELINE**
- 1 – Project plan development
- 2 – Guideline draft development
- 3 – Review and approval
- 4 – Publication

**79 PARTICIPATING COMPANIES**
- ABB, ACCENTURE, ACORN, ALEX ATKINS & ASSOCIATES, ALPHA TECHNOLOGIES, APEX AUTOMATION, AVEVA, BARRICK GOLD, BHP, BOLIDEN, BUSINESS SWEDEN, CAMBORNE SCHOOL OF MINES, CAMIRO, CEMI, CENTRIC MINING SYSTEMS, COMMIT WORKS, CORFO, DESERT FALCON CONSULTING, DASSAULT SYSTEMES, DATAMINE, DELOITTE, DESWIK, ECM NETWORKS, EPIROC, ERICSSON, FLOW PARTNERS, FLUIDMESH NETWORKS, FREEPORT-MCMORAN, GLENCORE, GLOBAL IO, GOLD FIELDS, GRIPITION, HATCH, HEXAGON MINING, HINDALCO, IBM, JVA, KOMATSU, KPMG, LAC DES ILES MINE, LUNDIN MINING, MACLEAN ENGINEERING, MAESTRO DIGITAL MINE, MICROMINE, MINERP, MINETEC, MOBILARIS, MST GLOBAL, NEWMONT, NEWTRAX, NORTH AMERICAN PALLADIUM (NAP), NORTHERN LIGHT TECHNOLOGIES, NORTHERN STAR RESOURCES, ORBCOMM, PA SPATIAL, PRONTOFORMS, PROUDFOOT CONSULTING, PT UKU TECH INDONESIA, QVARTZ, ROCKWELL AUTOMATION, RPM GLOBAL, SANDVIK, SCANIA, SDMT, SIEMENS, SITECH, SKF, SYMBIOTIC INNOVATIONS, TECHNICAL UNIVERSITY OF MADRID, TECK, TERRATIVE DIGITAL SOLUTIONS, THIESS, TITAN MINING CORP, UNIVERSITY OF QUEENSLAND, VALE, VOLVO, WEST ARM CONSULTING GROUP, WIPRO CONSULTING, YOURPACE
ISO TC82/SC8 Update

The ISO sub-committee committee for Advanced Automated Mining Systems (ISO TC82/SC8) was officially kicked off at its first plenary meeting in September. The meeting was well-attended, with 28 participants from 10 different countries and with strong and varied stakeholder representation.

This meeting’s outcomes include:
- Establishing an SC8 advisory planning task force to review key planning documents and new work items. Their first task will be to review the revised program of work which was reviewed and updated at the plenary.
- Agreeing to work closely with TC 127 (Earth Moving Machinery) on all related work.
- Agreeing that it was critically important to plan and acquire necessary input on work items from both within mining and the SC8 sub-committee and from external mining organizations and industry associations.

Work planned for 2019 includes:
- SC8 joining with TC 127 on existing joint working group (JWG) to participate in the development programs for ISO 17757 Autonomous Machine Safety and ISO 21815 Collision Awareness and Avoidance.
- SC8, as part of the JWG, will participate in the planning for the next version of ISO 17757 in 2019. The new GMG Autonomous Mining Functional Safety project should provide strong input into its content.
- Initiate JWGs with TC 127 for two new projects: Remote Stop Function for Mining Equipment and Fleet Management and Autonomous Haulage Interoperability.

The revised program of work (to be documented by the end of the year) will be used to draft the strategic business plan for SC8, which is forecast to be done in late Q1 2019. The four JWG project development projects for 2019 will be scheduling meetings to be held in North America in the last two weeks of March 2019. The next SC8 plenary meeting will be in Sweden and is anticipated to take place in mid to late September 2019.

For more information, please contact:

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