



**INTEROPERABILITY
WORKING GROUP**

INTEROPERABILITY DEFINITIONS AND ROADMAP

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.

MINING INTEROPERABILITY DEFINITION

Interoperability is the ability of two or more systems, components or processes to exchange contextualized information in order to act on this information to achieve business and operational outcomes.

ROADMAP

	2019-2021	2022-2023	2024-2029
Sustainable Industry Alignment, Engagement	<ul style="list-style-type: none"> GMG Interop Guideline V1 published Achieve the coalition of the willing! 	<ul style="list-style-type: none"> Harmonised standard adopted globally 	<ul style="list-style-type: none"> Solid foundation of interoperability enabling competitive environment for innovation and business
Architecture/Reference Framework	<ul style="list-style-type: none"> Reference architecture, language and reference data model defined and agreed Platform alignment Open Mine Format leveraged Standards development 	<ul style="list-style-type: none"> Plug and Play software/technology add-ins available One open standard for data movement through entire mining system 	<ul style="list-style-type: none"> Supercharge/accelerate universities to continue to support interoperability and collaborative innovation
Education	<ul style="list-style-type: none"> Address skills requirements for IT/Data technicians and engineers <ul style="list-style-type: none"> Vocational education and training Up-skilling in-house resources 	<ul style="list-style-type: none"> Available resources with interoperability experience and skill sets to deliver, maintain and innovate the interoperability technology Vocational Education and Training (VET) + university level course(s) available on interoperability 	
Develop Test Bed/Sandbox	<ul style="list-style-type: none"> Demonstrate value proposition and Iterate through <ul style="list-style-type: none"> Living case study (SA Consortium) – collaboration around one operation Proof of Concept Platform(s) demonstration Focus on "Quick wins" 	<ul style="list-style-type: none"> Pilot small scale/lab scale demonstrations of system(s) of interoperability A national/international/commodity specific "sandpit" for interoperability part of the Global Test Bed Network (GTBN) Common test track/environment for innovation (i.e. mining Nuremberg ring) 	<ul style="list-style-type: none"> Demonstrated reduction in costs across the board due to a realised interoperability
Collaboration	<ul style="list-style-type: none"> Collaboration on Industry 4.0 topics Leverage other industries, collaborations and standards (cyber security, aerospace, automotive, defence...) 	<ul style="list-style-type: none"> Industry collaboration – the norm not the exception Centre of excellence for Industrial Internet of Things (IIoT) for mining and energy resources industry Increase collaboration between miners, manufactures and technology companies to build compelling solutions 	<ul style="list-style-type: none"> Sustained collaborative innovation through cognitive diversity

PRINCIPLES

Principles are an essential truth, constant, constraint, clarification, assumption, consequence, dependency or governance upon which interoperability, as defined, is based.

- ✓ Industry Priority and Importance
- ✓ Data
- ✓ Control
- ✓ Safety
- ✓ Governance/Certification

PARTICIPATING COMPANIES

3D-P, ACQUIRE TECHNOLOGY SOLUTIONS, AIKOLOGIC, AKROM, AMAZON, AMIRA, AMTC, ANGLO AMERICAN, ANTOFAGASTA MINERALS, AUSTMINE, AUTOMATED SYSTEMS ALLIANCE, AUTONOMOUS SOLUTIONS, AVEVA, BARRICK GOLD, BBE, BESTECH, BHP, BOLIDEN, CAMBRIAN COLLEGE, CANADIAN NATURAL RESOURCES, CATERPILLAR, CEMI, CHECKMARK CONSULTING, CIA MINERA QUECHUA S.A., CIA MINERA PODEROSA SA., CISCO, COMPAÑIA MINERA DOÑA INÉS DE COLLAHUASI, CODELCO, CORFO, COSMOS TECHNOLOGIES, CSA GROUP, CSIRO, D & V ELECTRONICS, DASSAULT SYSTÈMES, DEXCENT, DHEMAX SPA, DRAEGER, EATON, EMERSON ELECTRIC, ENDEVEA, ENERGETICS, ENVIRO INTEGRATION STRATEGIES, EPIROC, ESCO, ETP, FARELLONES INGENIERA, FIE / MINISTRY OF ECONOMY OF CHILE, FLANDERS ELECTRIC, FLOW PARTNERS, FMP GROUP, FOSTERGY, FREEPORT-MCMORAN, FREEWAVE TECHNOLOGIES, FUNDACIÓN CHILE, GE MINING, GENERAL DYNAMICS, GEOSYSTEMS ANALYSIS, GLENCORE, GLOBAL IO, GODELIUS, GOLDCORP, GS1, GUARDVANT, HATCH, HC-GROUP, HEXAGON MINING, HONEYWELL, IBM, ICONO ADVISORY, IDS GEORADAR, IMPERIAL OIL, INDUSTRIAS INTELIGENTES, INNOVATIVE WIRELESS TECHNOLOGIES, INSTITUTO NACIONAL DE NORMALIZACION, IREDES, ITELECOM, JANICE FINGLER & ASSOCIATES, JONES DAY, JVA, KOMATSU, LESS INDUSTRIES, LIEBHERR, LKAB, LOCKHEED MARTIN, MACLEAN ENGINEERING, MATRIKONOPC, MCKINSEY, METS IGNITED, MICROMINE, MINE SITE TECHNOLOGIES, MINE VISION SYSTEMS, MINEOPOLY PTY, MINERA CANDELARIA, MINERA CHINALCO PERU S.A., MINERA YANACOCHA, MINERP, MINESENSE TECHNOLOGIES, MINETEC, MINEWARE, MINING3, MINNOVEX A.G., MODULAR MINING SYSTEMS, MOTION METRICS, MOTOROLA, MST GLOBAL, NATURE UNLIMITED C.I.C., NEWMONT, NEWTRAX, NHP ELECTRICAL ENGINEERING, NIOSH, NOTIFORM, NRC-IRAP, OBJECT MANAGEMENT GROUP, OCTAGON SYSTEMS, OLIO TECHNOLOGY SOLUTIONS, OPC FOUNDATION, OPTALERT, OPTIMISA S.A., ORBCOMM INC., OSISOFT, PECK TECH, PIVOT INDUSTRIES LIMITED, PRAIRIE MACHINE & PARTS, PROGRAMA ESTRATEGICO DE INDUSTRIAS INTELIGENTES, PSA INTEGRATION, RAJANT CORPORATION, REAL IRM, RIGID ROBOTICS, RIIIVOS, RIO TINTO, ROCKWELL AUTOMATION, RPM GLOBAL, SEEQUENT, SHYFT, SIBANYE-STILLWATER, SIEMENS, SILENT SOFTWARE, SKYMINEUAV, SMART SYSTEMS GROUP, SPARHAWK SOFTWARE, SPOKANE MINING RESEARCH DIVISION, STRATA WORLDWIDE, SUNCOR ENERGY, SYMBIOTIC INNOVATIONS, SYNERGISTICS, SYSENE CONSULTING, TECK, TECNOEXPLORA, THE CYEST, THE OPEN GROUP, THIESS, TRIMBLE, TYCO SIMPLEXGRINNELL, UNEARTHED SOLUTIONS, UNIVERSIDAD CHILE, UNIVERSIDAD DEL DESARROLLO, UNIVERSITY OF ADELAIDE, VALE, VANDRICO, VISAGIO, VISUAL INTELLECT, WENCO, WIPRO CONSULTING, WIRELESS SENSOR NETWORKS

Also covered in this guideline...

- BUSINESS/OPERATIONAL PROBLEMS TO SOLVE, OBJECTIVES, VALUE PROPOSITION
- MINING INTEROPERABILITY DEFINITION
- MINING SCOPE
- OPERATIONAL SCOPE
- STAKEHOLDER SCOPE
- PRINCIPLES
- END STATE
- CURRENT LANDSCAPE
Stakeholder Groups
- FUTURE INDUSTRY ACTIONS AND PRIORITIES
Implementation and Execution Success Factors and Plan
- OTHER USEFUL DOCUMENTS