GLOBAL MINING GUIDELINES GROUP

GMG

Innovation through collaboration.

# MOBILE EQUIPMENT OPEN DATA V2.0

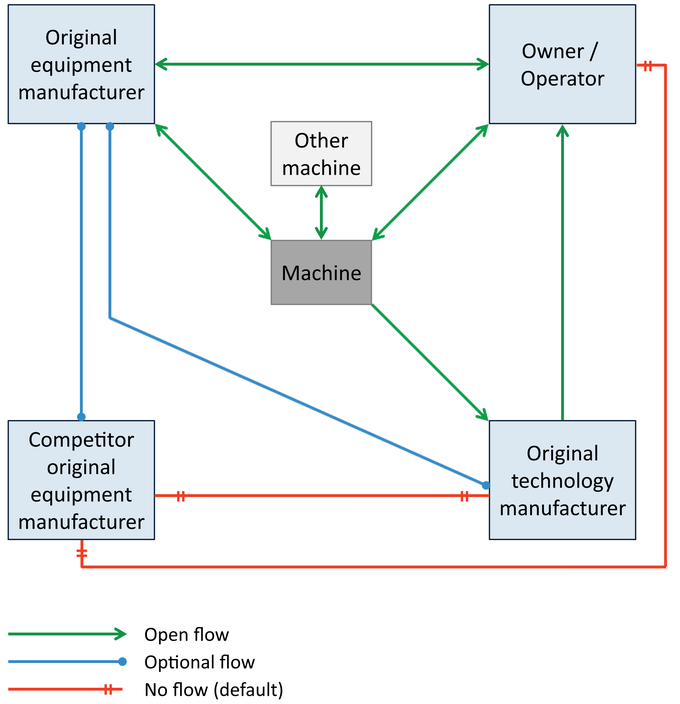
DATA ACCESS AND USAGE WORKING GROUP

To establish a common vision around the principles, guidelines, policies, procedures, and standards 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.

The open data consensus was developed between OEMs and their customers and the mine owners/operators. The guideline suggests that, by default, all machine data should, in principle, be available and open to the equipment owner in a local (i.e. real-time, not cloud-based) read-only format. This includes sensor data related to the mine environment and operation of the mine, thereby permitting the operator to optimize safety and performance in mining, milling, refining, fleet maintenance and asset management. This may also include data that is required to facilitate the functionally safe, autonomous control and operation of the vehicle using autonomy solutions from 3rd party technology providers. Exceptions to this default (e.g. cases of vital IP) may be negotiated in good faith between OEMs and owner/operators.

## Framework of Common Beliefs

- Operators and OEMs are in the best position to lead the market regarding identification, availability, and use of open equipment data.
- Data can be used for mine operations, equipment operation, reliability studies and maintenance, and building visibility in optimizing the value chain.
- Equipment data/information will significantly improve mine operations across many areas, including safety, productivity, maintenance, availability, and sustainability.
- When OEMs make real-time sensor data more accessible, it extends the opportunity to Operators to analyze said data and make better operating decisions.
- When Operators support their OEMs by granting easy access to machine generated data, OEMs can make better decisions about equipment specification and design.
- More equipment data will be required in the future to support advanced automation and autonomous vehicles.
- There is a difference between buying equipment and buying equipment intellectual property (IP).
- There is a difference between the data and the services and application systems they enable (dependencies) – competitive advantage is at the services and application layer.
- Where potential environmental, health, or safety impacts exist, regulatory and standards committees will often mandate requirements if the industry is not taking independent action. Proactive industries tend to shape regulation instead of being subjected to the uncontrollable outcomes. Thus, establishing open data principles and access will support these efforts by the owners and operators.
- General Data Protection Regulation (GDPR) describes mandates for personal information collection in the EU. As a globally generated guideline, this consensus does not override any part of the GDPR or any other regional legislation concerning data.




A simplified default flow of machine data from mobile equipment. This diagram does not exhaust the possible parties or directions. In general, the flows shown in the diagram are default states and are subject to negotiations between parties and other practical factors such as cost and interface feasibility.

## PARTICIPATING COMPANIES

ABB, AGNICO EAGLE, AMAZON, AMTC, ANGLO AMERICAN, 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), DESWIK, EARTHSOFT, ENDEVEA, EPIROC, FLOW PARTNERS, FORTESCUE METALS GROUP (FMG), FOUNTAIN TIRE, FREEPORT-MCMORAN, GE MINING, GIBRALTAR MINE, GLENCORE, GLOBAL IO, GOLDCORP, HASTINGS DEERING, HAULTRAX, HITACHI, IBM, INDIGO, INNOVATIVE WIRELESS TECHNOLOGIES, JVA, KGHM INTERNATIONAL, KOMATSU, LIEBHERR, METS IGNITED, MICROMINE, 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