8:30 AM -Mark Richards - Opens the meeting

- Olympic and Paralympic medal display 8:30 – 9:00

9:00 – 9:20 Tim Skinner - SMART Background and Context

9:20 – 10:00 Laeeque Daneshmend – Operator Position

- Data ownership – should the mine operator own the data and information resulting from data manipulation or processing? Raw data for sure, but not necessarily the results of some OEM/OTM processing. NO: we just want the raw data

Erik Zimmerman - Komatsu Mining Shovels

- Komatsu hydraulic mining shovels division is expecting to release new interfaces and data sharing through Modular.
- Still have some issues to overcome with Japan regarding the release of real time information.
- Different demands from the client vary from country to country due to legal and cultural differences.
- The dealer filters the transaction and adds their own legal terms and conditions imposed upon the customer.
- There is a fear of losing competitive advantage which influences the decision of Komatsu.
- Liebherr, as an example, could leverage the data from Komatsu shovels for one of their own shovels as a competitive advantage thereby short circuiting their R&D based upon the investment of time and money provided by Komatsu.

Claude Aboujaoude from Caterpillar

- Caterpillar has an interface (real time) with a published protocol provided a signed NDA.
- Service port interface may provide too technical data that may introduce risk for reverse engineering.

Laeeque Daneshmend/ Peter Cunningham

- Not having the access to the service port is limiting when the warranty has expired.

According to Modular:

- Komatsu Statex (old DC) drive interfaces are not readily available: GE interface but Komatsu must give the permission to release this information.

According to P&H

- The mine operator has raw data. P&H only charges for, and is willing to provide, the value added processed data. Varying levels of proprietary data, some more valuable than other data.

Bucyrus and Terex:

- Streaming online data to an external application is not facilitated nor supported.

Floor Statement

- Costs based per interface, e.g. Cat VIMS interface could be cheaper than say Komatsu where there are multiple interfaces.

Modular Mining:

- Modular has moved away from proprietary "Forms" based reporting to an MS SQL Server Reporting Services.
- However, some of the next generation still relies upon the old "Forms" platform yet training will not be available for mine operators.
- Modular training for old "Forms" based reporting has ceased for 7 years due to a small minority of total customers still using "Forms" – changes and customizations are still available on a for-hire basis through regional support offices.
- For legacy systems the upgrade is necessary. DISPATCH NextGen is a server-only upgrade for customers running MasterLink field computer systems. Systems purchased after 2001 are able to upgrade to NextGen using their existing field computer systems. Customers with mobile hardware from 2001 and older require a field hardware replacement to migrate to NextGen.

Modular continues to offer support for existing functionality on legacy systems for customers who choose not to upgrade.

Floor Statement

- Have received promises for Komatsu 1500 and 930E VHMS access.

10:00 – 10:20 Peter Cunningham - Teck Open Standards in Mobile Computing

- Consolidation of computing onto a single platform, it should have enough power to run any network
- One wireless network on the minesite for all needs
- Octagon computer - 480 computers
- AM/FM radio interference issue overcome now
- Windows XP Embedded
- VM running Linux to run Matrikon
- 3rd party comes in to install their network equipment
- Using Cisco 1310
- IBM helped design a wireless security architecture
- Challenges with the handoff when a truck turns

- while on board and the machine is not operating, training information can be sent to the operators, example: updates to the fire suppression that the operator should be aware of.
- 16 IP addresses per truck
- 254 IP addresses per shovel
- 3rd generation Octagon, none of the generations have power compatibility
- Bandwidth consumption / throughput is approximately 100 KB / minute per truck for Matrikon FMS but no VHMS

10:20 Tim Skinner break 15 minutes

10:30 Jon Peck – Introduction: Other Industry Standards Experience
Mel Torrie, Autonomous Solutions Inc., AS-4 Executive Committee Member, Creation of the AS-4 Robotics Interoperability Standard

- Agriculture is closer to standards based in this field than mining (ISO Virtual terminal) hit the tab from one consolidated terminal that you want, by OEM, from the common interface
- Follows the model set by Military
- Replace silo solutions
- Easy integration
- Provided some funding for leadership/missionaries to stand up an open standard
- Established a common language: autonomous / semi-autonomous means different things to different people
- Agnostic toward platform, mission, hardware, technology, communications, …
- Unification of the end users and consistent support levels helped overcome the obstacles
- Pentagon came out and stated: "you will use JAUS"
- Building consensus and keeping momentum, turn over/new members
    - re-education
    - overcome through documentation that also contains history
- Avoided insertion of 100% solution - can be too hard to implement and kill the solution
    - 80% solution may be sufficient
- Avoid single entity interest/insertion
- SAE – membership
    - Architecture Framework subcommittee
    - network environment subcommittee
    - information subcommittee
    - experimentation subcommittee
    - technical subcommittee
- Add lines to mine operators RFQs to bring compliance

11:10 Mark Bartlett, FMI, - OEM/OTM Position Themes

- Network assurances to OTM due to functional dependencies
  - perceived problems due to network problems
  - coexistence of applications
- Tools for measuring availability / bandwidth / throughput were not readily available
  - Peter Cunningham uses What's Up because he has an open network
- IP/Liability/Safety
- Mimosa – data schema (Laeeque) open standards based health data
- The proprietary algorithm can be avoided by operators providing there is a standard, by consensus, that will allow open access to the data without compromising the processes that could be leveraged by competing OEMs
  - troubleshooting tools that OEMs give to their own technicians have IP that is sensitive and gives them the advantage of servicing the machine
- OEMs provide the interfaces that they are willing to provide to operators and operators provide a wish list to the OEM/OTMs as a starting point
- Action Item: SMART come up with a common list of consolidated items that the operators would like to have from their machinery
  - OEMs provide list of data available to the operator
  - then we will address the gaps
  - standard in the making
- Modular Mining Les Zoschke - Should we follow the process outlined in the SAE example Mel Torrie provided above?
- Draft charter (scope, membership, governance, model) is suggested
- We can use the JAUS, or other similar framework, as a template to establish our own standard
- AEMP, Association of Equipment Management Professionals, is an example

11:45 Sterling McLeod - OTM – OEM Presentations

3D-P

- VM for OEM software and applications
- License 3D-P applications on other people's hardware, 3D-P is looking at allowing this

Jigsaw?leica

- network must meet minimum specifications
- need to make changes to the revenue model to account for standard common hardware
- prefer to encapsulate and then provide interfaces (views) of the 3rd party data

Modular/Komatsu

- they see no current interoperability standard
- use .NET, SQL Server, 802.11 for MasterLink
- SMART could play the role of organizational facilitator for interoperability, i.e. transfer of data between systems
- Believe the data created or captured within Modular is the property of the operator
- SMART needs to agree upon a governance model for its members
- What are the minimum resources and skill sets required on site?
- SMART will need to address issues of obsolescence, product lifecycle, and backward compatibility relating to developing future standards

- Komatsu is evaluating the use of SAE J1939 protocol for access to data streams from on-board systems
    - testing planned for rigid dump trucks this summer target implementation fall 2010
    - anticipate the use of a new box onboard to achieve this

Flanders

- Aardvark drill system
- All the customers are the same but may be at different levels of maturity, scale, or budget
- Mine operators own the data
- Concerned with the ability of the operator to change the configuration
    - would like to control modifications
    - repairs to PLC system become modification of functionality
        - safety concerns
        - machine breakdown / failure
- Trying to commoditize something that wasn't commoditized yet (easily).

Wenco/Hitachi

- Hitachi supports open standards based interfaces
- One time acquisition cost for the platform
- Customer should pay for the value added service which is what the acquisition cost is for.

Caterpillar

- VIMS is published to users who sign a NDA in it's current version
- Bidirectional TCP-IP: based integration with 3rd party applications for Aquila and CAES
- A new platform has been announced for interoperability Data Exchange
    - CAESultra and Aquila integration with 3rd party applications

- Next version of VIMS will have Ethernet interface - IP based
- Caterpillar align their strategy with the actions of their competitors
- Next version of VIMS will be supported via telemetry port just as the current version
- Will require VIMS PC for service port – processed data / prognostic data
- Question was raised and unanswered whether or not there will be a cost to the operator for the new VIMS

Atlas Copco (formerly Ingersoll Rand) 1:50
Ted Aikman

- IREDES -> http://www.iredes.org
- XML based
- Does not want anyone controlling their drills
- Mine operations interface defined in IREDES
- 3rd party interface document is available for Modular, Jigsaw, Wenco
    - define what data is sent
    - handshake
    - transmit
    - based upon specific requests from customers
    - would like to have surface mining industry consensus as to what data should be shared

Bucyrus

- Midas built upon a technology that is no longer supported, the Windows version
- Midas 2.0 SQL Server based technology - .NET
- Machine controls, IO, and subsystems
- Firewall challenges for remote access
    - security and flexibility tradeoff

LeTourneau

- Will participate in the future gladly
- Production data is open and free protocol based
- SAE process is encouraged by them
- Even keep Engineering access confined to their small internal group
    - access is not provided to all their internal staff either
- Some of the things there are locked down because it's sole purpose is for development

Liebherr

- Support open communication with 3rd parties
- Will also support Ethernet
- Will separate from Siemens and build their own drive system

    - enhance the diagnostics on their own wheel motors and drive systems, the new in house ones
    - integrated on new system CAN Bus
    - 282B was not
    - 282C is the new truck with their own wheel motors and drive systems
    - single point access to all systems that are available to 3rd parties
- Do not charge for access
- Will share that data
- Need to protect some of the data from the design perspective

Komatsu

- Komatsu Excavator had three options for the operator to access data
    - get on board the shovel to access the data
    - Download via mine WiFi
    - Satellite communications
- Do not want damage to result from opening up all access
- Willing to listen to what data we want
- Will provide some subset of the available data
- A consolidated global standard would be the least expensive approach for the operators
- Would like to build on an existing standard instead of scrapping the progress of the OEM so far
- Although the OEM is able to build a tailor made solution it would not be cheap
- Integration between OEMs is desired and would require compliance from all competitors
- Construction standard exists for this already; see above where Agriculture standard is addressed.

P&H

- Centurion open protocol
- Plug and play
- IP (intellectual property) is an issue with software interface for 3rd party
- Customer has access to the raw data
- Have SMART provide a guideline

Sandvik

- Liability / IP issues are a concern when interfacing with 3rd parties
- Remote operation station for the drill
- Ethernet IP and camera systems included in open standards interfaces
- IREDES standard is the only one they are aware of and recommends/proposes we utilize that standard

- OPC UA technology for real-time access - Drill Information Gateway, CanOpen
    - pressures, temps, penetration rate, rig state/mode
- Happy to participate in standardization process
- IREDES has existing XML schema
    - drill plans
    - quality report
    - performance report
    - MWD report (pressures penetration rates)
    - maintenance report
    - gateway to 3rd party PC

P&H and Liebherr:

- OPC being used by P&H and Liebherr as well

3:05 Ed Desjardins – Summarize Positions
Operator Perspective:

- Want access to low level and appropriate data
    - downstream applications applied at operator's discretion
- Hardware agnostic plug and play
- Common/open protocols that facilitate integration and the co-existence of a variety of applications on a variety of equipment
- Minimum footprint in equipment
- Technology independence
- Tired of reinventing and development for each new solution

OEM OTM

- Concern over complete data ownership by operators
    - some data could compromise competitive positions, allow reverse engineering
    - prefer provision of selective data distinguishes between proprietary and non-proprietary
- Concern that independently deployed communications systems and hardware will not perform
- Standardize what everyone wants

Common Ground

- Recognition that integration is required and beneficial
- Standards make life easier
- Governance on any standards is required
    - SMART may or may not be right organization
- 100% of data not necessarily required
    - define subsets by equipment type and application
        - health optimization

General Discussion:

- Autonomy and control of the equipment and use of the data for such purposes probably another conversation.

Tim Skinner
- the integrator is the mine

Brent Deener, Caterpillar
- who informs the operators what being an integrator means

General Floor comment:
- There needs to be a level of maturity for mines.
- We must establish a vocabulary with definitions and an agreement of terms.

Craig Watkins: (3 types of customers)
- I want do it
- do it with me
- give me all of it

Comments from the floor:

Standards will be scalable: provides a starting point
- Knowledge transfer is a goal of SMART.
- There has to be some people who can make the commitment to make this standardization their day job. The risk of failure looms otherwise.
- We need another level of effort beyond the part-time volunteer basis.
- Legacy issues: is the expectation that the legacy should be brought to the level of compliance with the new standard at no charge?
- OEM / OTM should provide the manual and specifications for the legacy that is not ever going to be brought into compliance

Some concern exists on how to create a GUI that is standard (minimal in number not necessarily a single one)

3:40 Steve Thornton – Next Steps
- SMART To Do:
  - Provide a data template within 30 days for the OEM/OTM to list read-only data that is, or can be, provided to the mine operator
  - SMART to generate a common list of the data required by the operator by equipment type: truck, dozer, shovel, excavator, drills, etc
    - SMART will consolidate the lists provided by OTM/OEMs categorized by equipment type ie. Dozers, end dumps, drills, etc.

- OEM / OTM To Do:
  - Provide a list of the read-only data they will currently provide, and what they are willing to provide that is not currently known or available - this list should be so generic as to prevent NDA breaches (ie. engine temp, coolant temp, … instead of specifics)
  - This list to be provided within 60 days of receiving the SMART provided format and/or data template

Komatsu

- there are varying service levels for access levels pertaining to the dealers

3:50 Tim Skinner - Close:

- OEM/OTMs, who had not submitted a presentation, are to provide PDF copies of their verbal or PowerPoint presentations during the OEM/OTM session to Tim Skinner
- Tim will provide the OEMs, OTMs, and SMART presentations available on the SMART website
- SMART should come up with an organizational structure, mechanisms, and governance model to support the ongoing development of standards.
- Anticipate a next meeting in 4 months – exact time and place to be determined. Agenda to be jointly developed but it should expect to review and "agree" on read only data and review and discuss initial organizational structure alternatives for proceeding