Particle Size Analysis Boulder Detection Missing Tooth Detection Tooth Wear Monitoring Lip Shroud Monitoring Blind-spot Monitoring Video Recording

Introducing the next generation in G.E.T. & Shovel Monitoring

MOTION METRICS



ShovelMetrics is part of the Weir Motion Metrics Mine to Mill Ecosystem of solutions. An integrated suite of productivity, safety, and downtime mitigation systems, which provide critical data of the comminution process.

MotionMetrics.com



ShovelMetrics - Gen. 3, powered by proven machine learning algorithms trained on two decades of mining data, provides accurate and reliable information in the toughest mining environments. More than 80 mines worldwide trust ShovelMetrics to keep their employees safe and operations productive. Contact your local Weir Motion Metrics office to determine how our fully managed shovel service can help your mine.

Now, Weir Motion Metrics is reinventing our flagship solution with industry-leading 3D imaging technology to bring you the most advanced shovel monitoring service on the market. With support for all types of shovels, excavators, and backhoes, ShovelMetrics Gen. 3 is a fully managed shovel monitoring service that provides:



Weir Motion Metrics is a Canadian mining technology company that installs rugged smart cameras at open-pit mines worldwide, then uses artificial intelligence to turn that video data into actionable insights that improve mine safety, energy efficiency, and productivity.



Technology that enables safe, sustainable, and smart mining.





NEW

G.E.T. Monitoring

ShovelMetrics' world-class G.E.T. monitoring system uses artificial intelligence and 3D computer vision to provide accurate and reliable missing tooth detection, tooth wear monitoring and now includes the industry's first lip shroud detection system. Designed to prevent dangerous and costly crusher obstructions by alerting operators to missing G.E.T. components before they travel downstream, ShovelMetrics Gen 3 pays for itself by increasing productivity and reducing operational downtime.

Missing Tooth Detection

Identifies full or partial broken shovel teeth or adapters that occur during normal operation in real-time.

Features:

Provides a decision for the status of each tooth for every cycle of shovel operation where the tooth line and teeth are visible.

Alerts the shovel operator with a visual and audible alarm within a maximum of 3 cycles of operation in the event of a missing tooth, adaptor, or lip shroud.

Identifies the position of the missing tooth on the bucket and logs at least one image of the incident with the associated time and date.

Convenient auto calibration without the need for manual adjustments.

Cloud Processor:

Provides functionality to review captured logs chronologically on MetricsManager Pro.

Tooth Wear Monitoring

Tracks the changes in teeth lengths due to normal operational wear, allowing personnel to optimize tooth change-out intervals and mitigate tooth breakage incidents.

Features:

Tooth wear monitoring tracks the reduction in the length of each tooth that happens slowly over time and has a median error of 1cm and maximum error of 4cm.

When a tooth is replaced, change-out events are detected automatically.

Cloud Processor:

The system can predict wear rate and estimate tooth replacement time with an accuracy of 5%, assuming operation continues with the same conditions.

Provides functionality to configure, view, and analyze the data on MetricsManager Pro.

Lip Shroud Detection

The world's first solution to identify missing bucket lip shrouds in real-time.

Features:

Lip shroud detection has an accuracy of 87%, which translates to a low rate of false positives.

Leverages the Tooth Monitoring[™] algorithm pipeline and works based on localization and tracking of each lip shroud.

Cloud Processor:

Provides functionality to review captured logs chronologically on MetricsManager Pro.







NEW

Rock Monitoring

Prevent dangerous and costly crusher obstructions by monitoring shovel tooth wear and alerting operators to missing G.E.T. components before they travel downstream. ShovelMetrics Gen 3 includes an advanced high definition bucket camera that improves the system's particle size analysis and boulder detection accuracy.

Particle Size Analysis

Accurate fragmentation analysis of each bucket load provides important particle size distribution data, helping to optimize drill and blast parameters and improve loading efficiency.

Features:

Provides accurate rock segmentation for material to a minimum of 4 square inches in size.

Captures at least one image of the shovel bucket in a position that clearly shows the fragmented material for each truck that is loaded by the shovel.

Dispatch integration and real-time customizable oversize material detection with less than 5% daily false detection rate.

Cloud Processor:

Calculates the sizes of individual rocks and their distribution in inches or centimeters and includes functionality to review and generate PSD reports on MetricsManager Pro

Provides functionality to modify algorithm configuration parameters on MetricsManager Pro.

Payload Monitoring

The payload monitoring feature is a reliable bucket-by-bucket monitoring system that delivers payload estimation while loading.

Features:

Provides accurate payload information to the operator for each shovel cycle.

All hydraulic face shovels and backhoes are currently supported.

The system is accurate to better than +/- 5% of every bucket load.

Displays tonnage of material currently in the bucket as well as amount of material that has been loaded for the current truck.

Cloud Processor:

Displays truck load compliance on per truck and fleet basis.

Displays shovel payload statistics.

Displays shovel connection and calibration status.

Boulder Detection

Improve blast efficiency while minimizing crusher downtime and reduce rock-breaker usage by diverting oversized material.

Features:

Detects oversized material as defined by the mine and notifies the shovel operator with visual and audible alarms.

Boulder detection events are logged and saved to the cloud service MetricsManager Pro.

Cloud Processor:

Review and generate PSD reports on MetricsManager Pro

Provides functionality to modify overized material definition on MetricsManager Pro.





NEW

Shovel Surveillance

Improve operator awareness and incident analysis with shovel surveillance monitoring. High definition cameras on each side of the shovel reduces equipment blind spots and can record up to 3 days of footage at a time to the cloud from the surveillance views.

Blind Spot Reduction

Accurate fragmentation analysis of each bucket load provides important particle size distribution data, helping to optimize drill and blast parameters and improve loading efficiency.

Features:

Multi-point, high-definition colour views monitoring the left, right, and rear of the shovel in real-time.

16:9 widescreen multifunction monitor displays live views to the equipment operator.

Cloud Processor:

Live views of each system is always available to authorized personnel via MetricsManager Pro.

Video Recording

Continuous, high-resolution video recordings from all ShovelMetrics Gen 3 cameras are securely stored for each system and are available to authorized users.

Features:

3 days of continuous recording from the Blind Spot Reduction cameras are stored for each ShovelMetrics system

Recorded footage is reviewable by the operator or is accessible to authorized mine operations staff via MetricsManager Pro

Cloud Processor:

Recorded surveillance video for each system is available for three days to authorized personnel via MetricsManager Pro.













Bucket Camera 3D S/N: 5605 REV B



Surveillence View Cameras



15.6" LCD Monitor with Mounting Stand and 30ft of Video Cable S/N: 606221100702



MMI-SSD-DATA-8TB



DATA-SSD (8TB) Data Disk 1: S5VUNG0R201619F Data Disk 2: S5VUNG0R201605A



Volt-AC Voltage Converter S/N: 2101-511.0.0.56732



LED Light with base mount S/N: 202190136



80ft armored bucket camera cable (Type B)



50ft armored bucket camera cable (Type A)





Performance Details

ShovelMetrics Gen. 3 data is stored on our secure platform. All users with authorized credentials can access detailed reports, custom notifications, and actionable insights.

If you run a mine, you know that unplanned downtime and operational inefficiencies can endanger your employees and cost millions of dollars each year. For nearly two decades, ShovelMetrics has helped mines mitigate the biggest culprits – crusher obstructions, inefficient blasting, and improper loading.

Statistics

Module	Amount of Data (logs)	Accuracy of Data
SM-TM Visible	2000+/day	<3% Daily Avg. and <1.5% Weekly Avg.,
SM-TM Thermal	2000+/day	Lip Shroud Detection Bucket scale, auto ROI, automated segmentation, real-time FOD & oversized material detection with a false detection rate of <5% daily
SM-FM (face/backhoe)	100-200+/day	
SM-WM	100-200+/day	1", accurate enough to predict change-out, no manual correction needed
SM-PLM	Every Bucket, Every Truck	Bucket payload accuracy of +-5% in 95% of loads within 5 seconds Truck load accuracy +/- 5%, measured per truck

Savings On Costs - A ShovelMetrics Case Study

A large Chilean copper mine near Santiago used ShovelMetrics G.E.T. Monitoring to avoid an annual production loss of about **USD \$6.5M**.

A Teck coal mine in Canada used ShovelMetrics Rock Monitoring to **save 8.6 million kilograms of explosives** over a two-year period. The mine iteratively lowered its powder factor and **increased P80 by more than 20%** without negatively impacting the efficiency of excavation.





The system includes following components

Part #	Part Description	Qty
MS-SWLIC-100	ShovelMetrics [™] Software and License	1
MS-PRCPM-100	ShovelMetrics [™] Core Processor Module (SSDs Included)	1
MS-CMB3D-100	ShovelMetrics [™] BC3D Bucket Camera	1
MS-DSP15-100	ShovelMetrics [™] 15.6″ Touchscreen Display (With Cable)	1
MS-SSDOS-100	ShovelMetrics OS-SSD (128GB)	1
MS-SSDDT-100	ShovelMetrics Data-SSD (1TB)	1
MS-PSVAC-100	ShovelMetrics Power Supply for 110/220VAC source	1
MS-GWMOD-100	Gateway+ Module	1
MS-CMSRV-100	ShovelMetrics [™] Surveillance Camera Module	3
MS-LTLED-100	ShovelMetrics [™] LED light	1
MS-BRMCF-200	MCF200 Camera/light short bracket for BE495 shovels	1
MS-OTMCF-100	Safety Chain for MCF Brackets	1
MS-CBGND-8A	ShovelMetrics [™] CPU 8ft Lynk Connection Cable to Gateway	1
MS-CBGND-15A	ShovelMetrics [™] CPU 15ft Chassis Ground Cable	1
MS-CBCAM-50A	ShovelMetrics [™] 50ft Type-A Lynk Cable	2
MS-CBCAM-80B	ShovelMetrics [™] 80ft Type-B Lynk Cable	1
MS-CBCAM-69A	ShovelMetrics [™] 69ft Type-A Lynk Cable	1
MS-CBCAM-80A	ShovelMetrics [™] 80ft Type-A Lynk Cable	1
MS-CBCAM-15C	ShovelMetrics [™] 15ft Type-C Lynk Cable	1
MS-CBNET-30A	ShovelMetrics [™] 30ft Mine network Lynk Cable	1
MS-CBLED-3A	ShovelMetrics [™] 3ft LED Lynk Cable	1

Expert Service and Support

Motion Metrics' expert support staff provides on-site installation, maintenance, and training for all its systems.

As your partners in productivity, we offer service and support agreements that can include spare parts so your operation can remain informed and focus on what is important.

Learn more at: motionmetrics.com/service





The system includes following components



Product Name	Core Processor 1.0 (Embedded Computer)
Power Supply Voltage	28VDC
Power Consumption	150 - 200W (excluding I/O)
Operation Temperature	-25 ~ 55° C
CPU	Intel® Core™ i7, 3.0GHz
GPU	NVidia, 6GB GDDR5
I / O Interface	1x Touchscreen Display 9x Gigabit Ethernet 3x Serial 4x CAN 1x Power Input
Dimension	Width (side wall to side wall): 385.40 mm Depth (IO connector side to opposite side): 275.40 mm Height: 106.80 mm
Weight	Embedded Computer: ~10 kg



Product Name	Bucket Camera 3D
Image Sensors	2x monochrome imager (stereo) 1x color imager
Operation Temperature	-50 ~ 60 °C
Ingress Protection	IP68
Operation Voltage	28 VDC nominal 18-36 VDC range
Field of View (FOV)	Unrectified field of view of 91°h x 54°v
Active Pixels	1920 x 1200
Gain Control	Automatic
Dimension	360 mm x 145 mm x 65 mm
Weight	~ 1.9 kg



Product Name	LED Light
Input voltage	18-35 VDC
Output Voltage	28 VDC
Dimensions	440 mm x 245 mm x 150 mm
Weight	~ 8.8 kg
Ingress Protection	IP66
Operating Temperature	-20°C to +55°C



Product Name	DC/DC Voltage Converter
Input voltage	28VDC
Output Voltage	150 - 200W (excluding I/O)
Dimensions	440 mm x 245 mm x 150 mm
Weight	~ 8.8 kg
Ingress Protection	IP66
Operating Temperature	-20°C to +55°C



Product Name	Surveillance Camera
Image Sensors	OnSemi AR0239
Operation Temperature	-50 to +60°C
Ingress Protection	IP67
Operation Voltage	28 VDC Nominal, 18-36 VDC
Field of View (FOV)	137° H +/- 9° x 75°v, +/- 5°
Exposure/Gain	Automatic
Operation Voltage	Automatic
Field of View (FOV)	80mm x 80mm x 100mm
Exposure/Gain	>1,000g



Product Name	AC/DC Convertor
Input voltage	90-24 VAC
Output Voltage	28 VDC
Dimensions	440 mm x 245 mm x 150 mm
Weight	28 VDC Nominal, 18-36 VDC
Ingress Protection	137° H +/- 9° x 75°v, +/- 5°
Operating Temperature	Automatic





The system includes following components

Product Name	15.6"/13.2" Touchscreen Display, Adjustable Mount, 30ft Cable	
Power Consumption	< 15 W	
Supply Voltage	7.5 - 36 VDC	
Resolution	XGA (1024 x 768)	
Operation Temperature	-20 ~ 60 ° C	
Touchscreen Interface	USB - HID	
Contrast Ratio	600:1	
Resolution	XGA (1024 x 768)	
Touchscreen Type	Resistive Touch	
Size	290 mm x 249 mm x 51 mm	
Weight	~ 2 kg	



Product Name	Cellular Gateway, antenna, 15 + 30ft antenna cables, and 15ft LYNK.
Cellular	LTE Advanced, LTE
Antenna	Dome antenna (cellular, diversity, GNSS), cable length 15 feet, 30 feet extension.
Operation Temperature	15-foot LYNK for connection to Core Processor.
Contrast Ratio	7.5~36VDC (powered via LYNK).
Resolution	~ 4 kg
Touchscreen Type	-40°C to +60°C



Product Name	15 ft. Chassis Ground Cable
Material	PVC
Length	15 feet
Weight	~ 0.5 kg
Number of Contacts	1x #16
Voltage rating	600V
Operating Temperature	-40°C to +80°C



Product Name	OS-SSD (128GB)
Capacity	128GB
Operation Temperature	-40°C (-40°F) ~ 85°C (185°F)
Operation Voltage	5V±5%
Data Transfer Rate	Read: up to 530 MB/s Write: up to 470 MB/s
Terabytes Written (Max.)	2,940 TBW
Size	100 mm x 69.85 mm x 6.8 mm
Weight	63 g
Power Consumption	2.65 watt(s)
Shock	1500 G, 0.5 ms, 3 axis



Product Name	LYNK - 80 ft., Type B
Composite	CAT6A, 22/8
Jacket Material	Polypropylene
Length, Type	80 feet, Type B
Weight	~ 4.5 kg
Number of Contacts	22x #22
Voltage rating	600V
Insulation Resistance	1500V
Operating Temperature	-40°C to +80°C



Product Name	DATA-SSD (1TB)
Capacity	1TB
Operation Temperature	-40°C (-40°F) ~ 85°C (185°F)
Operation Voltage	IP67
Data Transfer Rate	Read: up to 530 MB/s Write: up to 470 MB/s
Terabytes Written (Max.)	2,940 TBW
Size	100mm x 69.85mm x 6.8mm
Weight	63 g
Power Consumption	2.65 watt(s)
Shock	1500 G, 0.5 ms, 3 axis





The system includes following components



Product Name	LYNK - 50 ft., Type A
Composite	CAT6A, 22/8
Jacket Material	Polypropylene
Length, Type	50 feet, Type A
Weight	~ 2.8 kg
Number of Contacts	22x #22
Voltage rating	600V
Insulation Resistance	1500V
Operating Temperature	-40°C to +80°C
Composite	CAT6A, 22/8
Jacket Material	Polypropylene



Product Name	LYNK - 3 ft., LED Light Power Cable
Power Supply Voltage	22/10
Power Consumption	TPE, Polyamide Monofilament
Length	3 feet
Weight	~ 0.23 kg
Number of Contacts	11x #22
Voltage rating	600V
Insulation Resistance	1500V
Operating Temperature	-40°C to +80°C



Product Name	LYNK – 30 ft., Mine Network Cable
Power Supply Voltage	CAT6A
Power Consumption	TPE
Length	30 feet
Weight	~ 0.7 kg
Number of Contacts	8X #22
Voltage rating	600V
Insulation Resistance	-40°C to +80°C







Our helpful representatives are present everywhere you do business. Contact your local office.

CANADA Headquarters

+1 (604) 822-5842 headquarters@motionmetrics.com

101-2389 Health Sciences Mall Vancouver, B.C. V6T 1Z3 Canada





BRAZIL + 55 (31) 3308-9331 brazil@motionmetrics.com

RUSSIA

+7-495-797-37-52 russia@motionmetrics.com

PERU +1 (604) 822-5842 peru@motionmetrics.com AUSTRALIA +61 (8) 6141 3126 australia@motionmetrics.com

CHILE +56 (2) 29693279 chile@motionmetrics.com

MEXICO +52 (662) 169 0869 mexico@motionmetrics.com BOTSWANA (+27) 53 0 040 333 botswana@motionmetrics.com

SOUTH AFRICA (+27) 53 0 040 333 southafrica@motionmetrics.com

KAZAKHSTAN +7 (771) 403-27-26 kazakhstan@motionmetrics.com

Visit our website

MotionMetrics.com

For additional information, advice, or support, please contact our team of solutions experts whenever you need them. Our helpline is open 7 days a week and you can visit our website for online support or product information.













