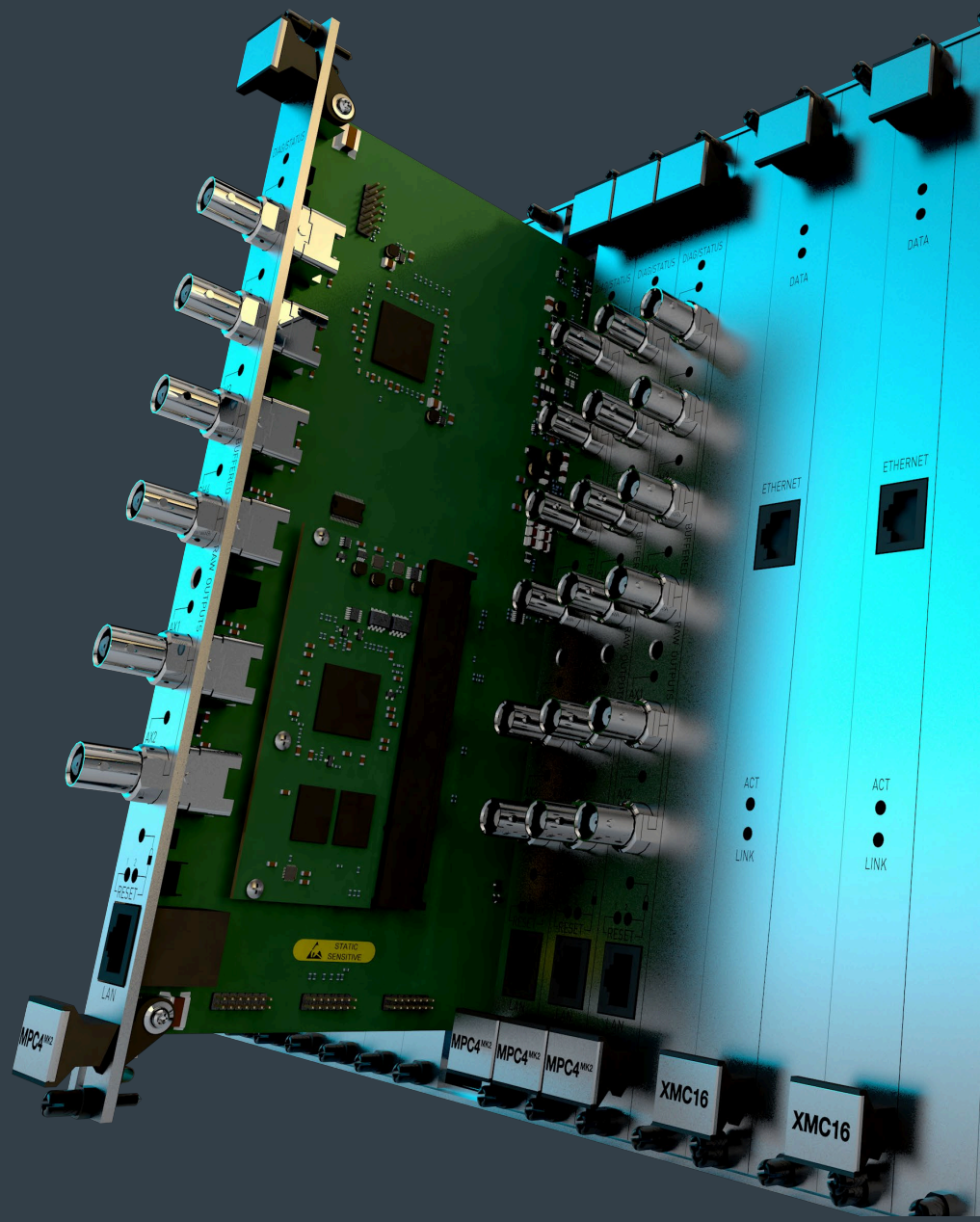
vibro-meter®

VM600 MK2

Successful applications



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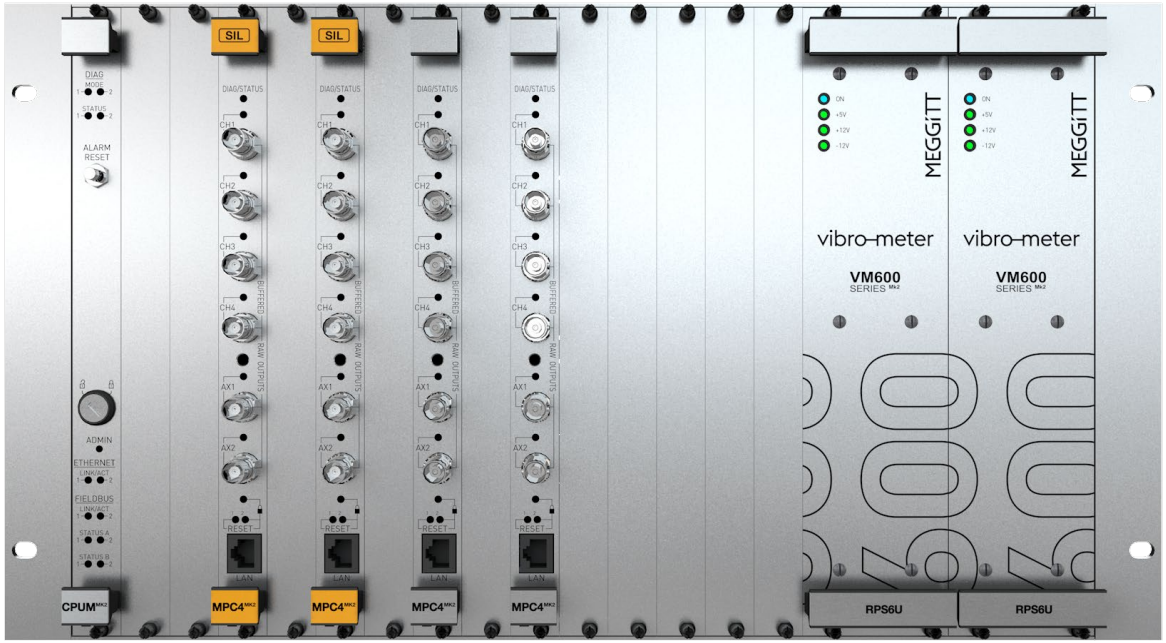
Successful applications

VM600Mk2

MACHINERY PROTECTION & MONITORING SYSTEM



Date: 24 November 2021

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VM600^{Mk2} successful applications

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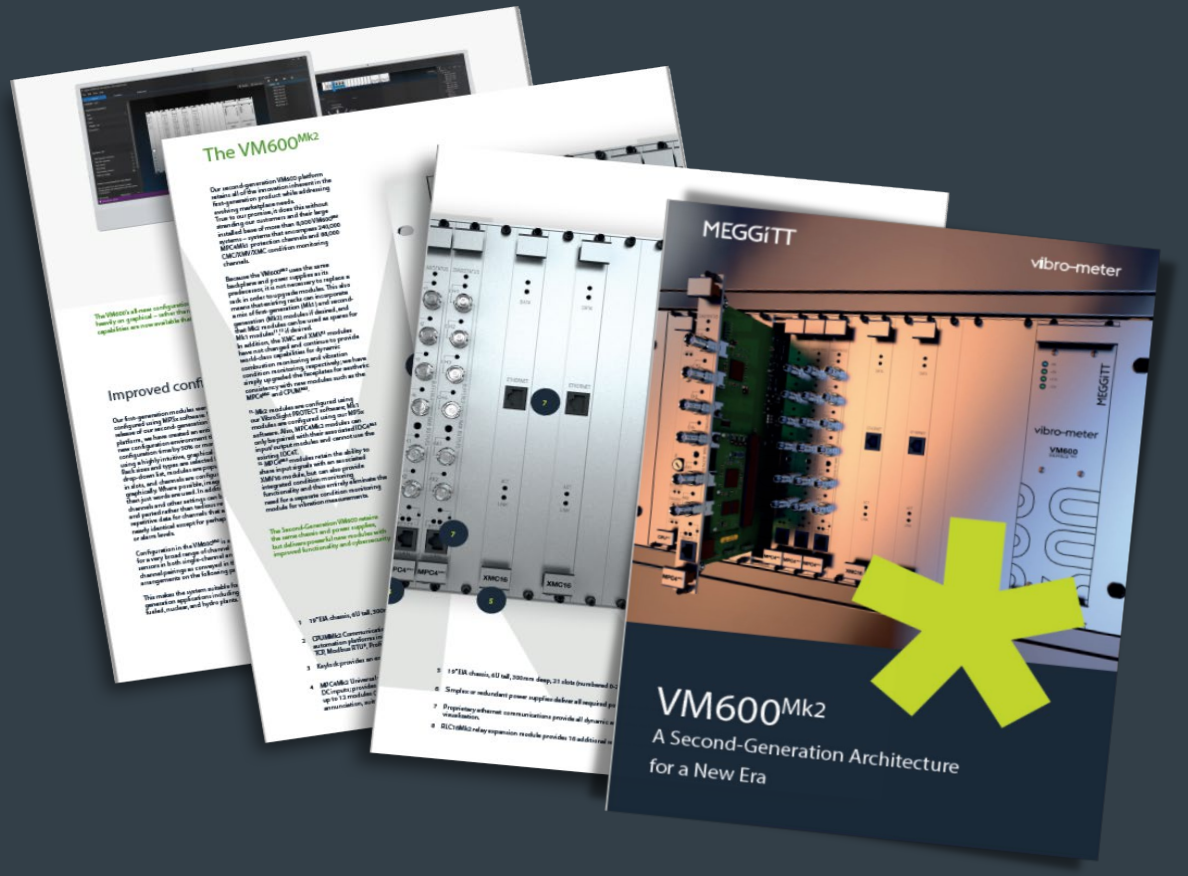

What do you do when the time has come for a replacement?

We do it better – **while maintaining backward compatibility** with the first-generation.

The "A Second-Generation Architecture for a New Era" is a comprehensive whitepaper detailing the all-new VM600Mk2.

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VM600MK2
KEY IMPROVEMENTS

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INTEGRATED CONDITION MONITORING

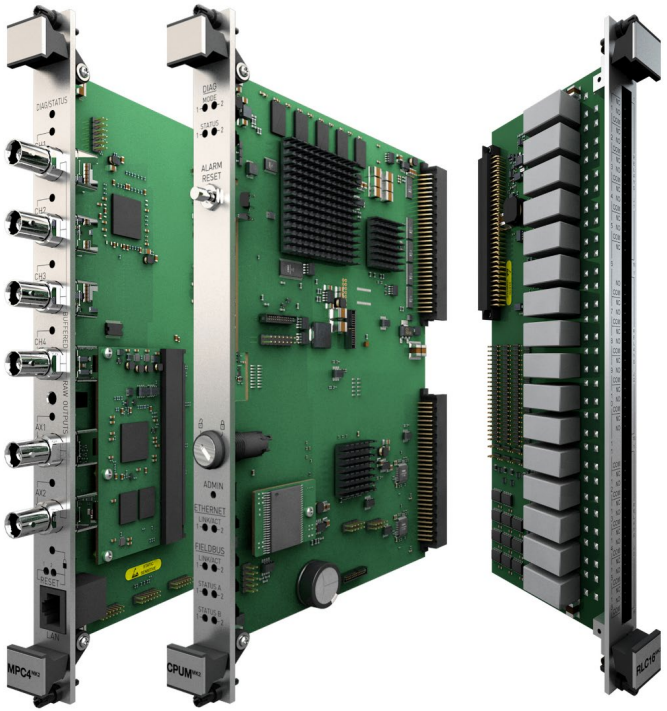
Why having an integrated condition monitoring?

- Speeds the configuration process
- Configuration in the condition monitoring environment thus adds to the basic protection configuration.
- Alarms and data are perfectly synchronized between the two environments
- Condition monitoring environment can be used to visualize everything while allowing an additional layer of alarming for earlier warning on any desired parameter.
- Gain in competitiveness by removing the need for extra hardware.

What about XMV16?

- Focus on supplementary signal processing and alarming to augment the basic protection system measurements – not re-creating them.
- For condition monitoring only applications
- Certain High-End Applications like Combustion Monitoring, Redundant Ports etc.

DELIBERATELY AVOIDING "RIP AND REPLACE"



The VM600Mk2 gives you the opportunity to refresh aging modules that may have reached the end of their useful lifecycle with new modules offering better functionality and performance, yet all while retaining the same chassis, wiring, and connectivity.

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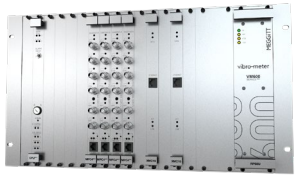
INTEGRATION ENVIRONMENT

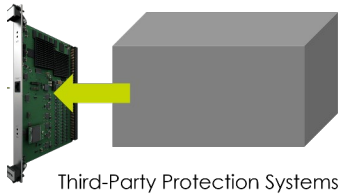
VM600^{Mk2}



VibroSmart

VM600^{Mk1}

Third-Party Protection System (via XMV16 modules)



Third-Party Protection Systems
(via XMV16 modules)

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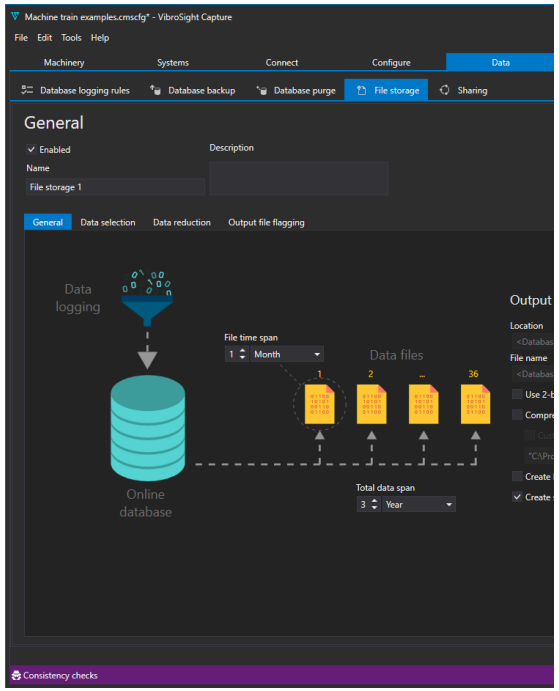
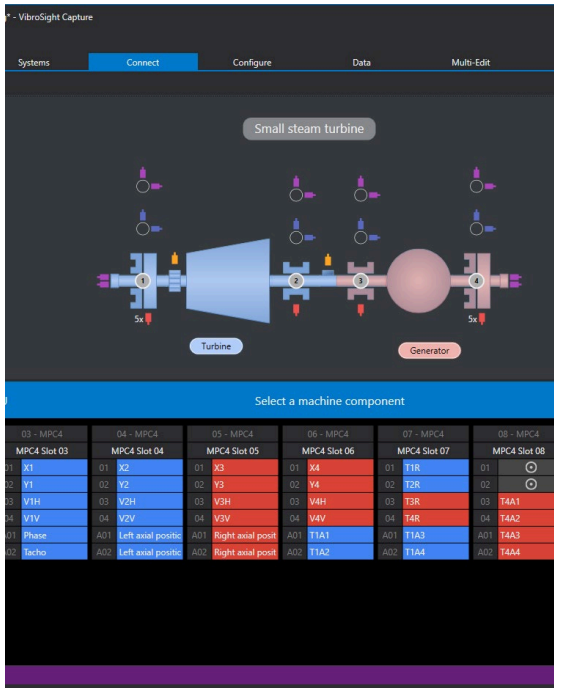
VM600^{MK2} CMS FEATURE

HIGH LEVEL

- Integrated cms with full visibility of mps
  - Segregation from MPS per API670
- New easy to use configuration software
- Machine trains layout (mimic)
- Available on both standard & SIL versions
- Addl. Memory on SIL version i.E. More power
- Up to 9 extraction per channel
- 100 msec update rate
- Up 6400 lines FFT @ 100 msec
- Configurable alarms/severity levels
- Fixed frequency & order tracking
- Dual channel processing
  - Full spectrum
  - Orbit
  - Shaft absolute vibration etc.
- Several windowing options for FFT
  - Rectangular, hanning, hamming,
  - Flattop, blackman, blackman harris, tukey..





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VM600^{MK2} PRICING UPDATE

VM600^{Mk2} & VibroSight Pricing Summary

3 Variants Of Standard MPC4^{Mk2}

- Standard MPS version: no change
- CMS Version: standard + CHF 1'280 (~ 50% ↓ v/s XMx16)
- Onsite upgrade: CHF1920 per module

❖ Check With RSM For Equivalent Currency, IPL Will Be Updated Shortly
❖ SIL & Cyber Security Compliant Version Pricing TBA Later…

Simplified Ordering & Pricing

- Simplified Ordering Option Code's…Down To 4 From 12+ Earlier
- 3 Software Editions
  - **Lite:** Same as Trend Version/MPS2 Equiv.. @CHF 3'750
  - **Classic:** Standard Vibrosight (Including Hydro) @ CHF 5'000
  - **Premium:** Classic + All Optional/Addon @ CHF 20'000
- SW pricing independent from hw platform (MK2, VibroSmart & XMV)
- Channel license @ CHF 250/channel
- Unlimited OPC/Modbus included in classic & premium editions
- Simplified support plan ordering & renewals
  - Fixed price per year based on sw edition
  - Simplified & separate code for renewals/extensions
- Rulebox: CHF 15'000

VibroSight Pricing & Ordering New Order

Code	Descriptor	Options	List Price	Seclection	Price	Explanation/Designation
609-004-000-SSS	VibroSight Software Package	--	CHF -	--	CHF -	VibroSight Software Package
A	Software Edition & Order Type	01	CHF 3,488	01	CHF 3,488	VibroSight Lite: Configuration & HMI Software For VM600^{Mk2} & VibroSmart Includes: - Trends, Bar Graphs & Mimic Suitable For Unlimited VM600^{Mk2}, VibroSmart & XMV Channels - Up to 128 OPC/Modbus Server/Client Tags
		02	CHF 4,982			VibroSight Classic: Basic Condition Monitoring Server And Client Suite: - Suitable For Standalone Or Multi Server Installations - 1 Network Client (For Network & Offline Client Users)
		03	CHF 19,982			VibroSight Premium: Advanced Condition Monitoring Server And Client Suite: - Suitable For Standalone Or Multi Server Installations - 3 Network Client (For Network & Offline Client Users) - Premium Addon Application's Package - Database Mirroring - Custom Mathematical Calculation Engine - Combustion Monitoring
		04	CHF 1,097			VibroSight Condition Monitoring Client Suite (For Network & Offline Client Users)
		05	CHF 482			VibroSight Protect, Configuration Software Package For VM600^{Mk2} & VibroSmart
B	VibroSight CMS Channel Licenses: Enter No. of Channels To Be Used e.g. - 00 For None, 128 For 128 Channels etc.	00	CHF -	00	CHF -	No Additional License (Applicable For A01, A04 & A05)
		64	CHF 244			Pricing Based On Qty Of Channel Selected: - CMS Channel Licenses For 16 Channels Included In VibroSight Lite Edition (A01) - All Other Features & Capabilities Depend On Software Edition Selected
C	Additional Client Suite (For Network & Offline Client Users)	0	CHF 1,097	0	CHF -	Enter Qty Of Additional Client Access License @ CHF1100 Per License: e.g. 0000 For None, 0010 For 10, 0017 For 17 etc.
D	Additional Software Maintenance & Support Plan (Price Is % Of Total Price Per Ordering Options) % Of A+B+C Price	00	0%	00	CHF -	No Additional Support
		01	15%			+1 Year, 15% Of Package List Price & Payable Upfront
		02	25%			+2 Year, 25% Of Package List Price & Payable Upfront
		03	35%			+3 Year, 35% Of Package List Price & Payable Upfront
Final Ordering Code Based On Selected Options				609-004-000-SSS-A01-B00-C0-D00		
Basic Price Without Addional Maintenance Support Plan				CHF 3,488		
Total Price With Addional Maintenance Support Plan				CHF 3,488		
Software Maintenance Support Plan Renewal Price For 1 Year				CHF 872		609-005-000-SSS-O1 (Calculated @25% Of Prevailling Basic Price)
Software Maintenance Support Plan Renewal Price For 2 Year's				CHF 1,221		609-005-000-SSS-O2 (Calculated @35% Of Prevailling Basic Price)
Software Maintenance Support Plan Renewal Price For 3 Year's				CHF 1,570		609-005-000-SSS-O3 (Calculated @45% Of Prevailling Basic Price)

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Competitive Landscape

2

Bently Nevada
a Baker Hughes business

SHINKAWA

VIBROSYSTM.

1

Bently Nevada
a Baker Hughes business

3

Brüel & Kjær Vibro
a spectris company

SHINKAWA

Bently Nevada
a Baker Hughes business

SENSONICS

SKF

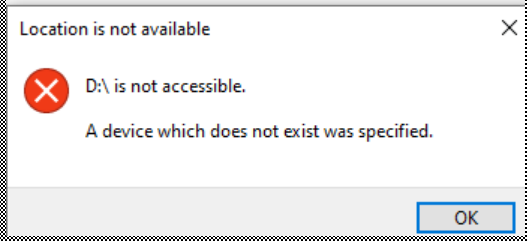
mcmonitoring

EMERSON

Rockwell Automation

NADA

0



Application Criticality

High

Low

Low

High

Online MPS & CMS infrastructure cost

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VM600MK2
SUCCESSFUL APPLICATIONS

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Hydro Project in Switzerland

Successful applications

Application: Etzelwerk Kraftwerke has 7 hydro units producing a total power output of 135 MW.

Project: retrofit of 4 Pelton hydro units between 2021-2023 producing more than 100 MW in total.

Scope of supply: 4 x machine monitoring systems (MMS) and 42 sensor chains.

- **VM600MK2 rack layout**
  - MPC4^{MK2} 2 or 4 card pairs
  - CPU^{MK2} 1 card pair
  - RLC16^{MK2} 1 module

- **Sensors:**
  - next gen TQ902/IQS900 proximity probes,
  - low frequency VE210 velocity sensors

Integrated Factory Acceptance Test (IFAT): June 2021
Commissioning: from Q1 2022 until Q4 2022.

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HYDRO PROJECT IN SWITZERLAND

Key learnings

Brand pedigree and innovation

- **New VM600^{MK2} positioned as an evolution of the VM600**
  - *Client knew VM600 System and understood Mk2 as lifetime extension.*
- **Brand pedigree:**
  - product reliability known amongst OEM
  - end-user requested vibro-meter due to high quality background

Competitive in price & features

- Best value for money: additional features compared to market reference:
  - *Value extractions (1x, 2x etc)*
  - *Access to have live spectrum and waveform during commissioning*
- Mk2 price competitive similar to Mk1 and competitor equivalent.

Flexibility

- Extended warranty (40 months)
- Final configuration of sensors later on

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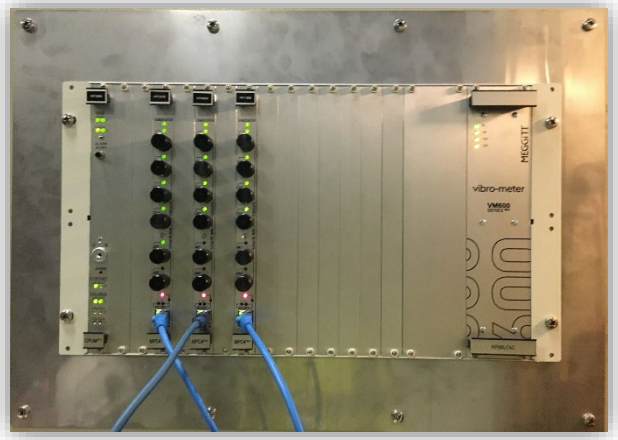
Steam turbine project in France

Successful applications



Application: waste processing facility that recovers heat from burning waste and use it to run a steam turbine and generate the energy

Project: retrofit of a 3300 Bently Nevada to monitor a 32MW Dresser Roand Steam Turbine

Scope of supply:

- **VM600^{MK2} to replace BN3300**
  - MPC4^{MK2} 3 card pairs
  - CPU^{MK2} 1 card pair
  - RLC16^{MK2} 1 module

Commissioning: October 2021

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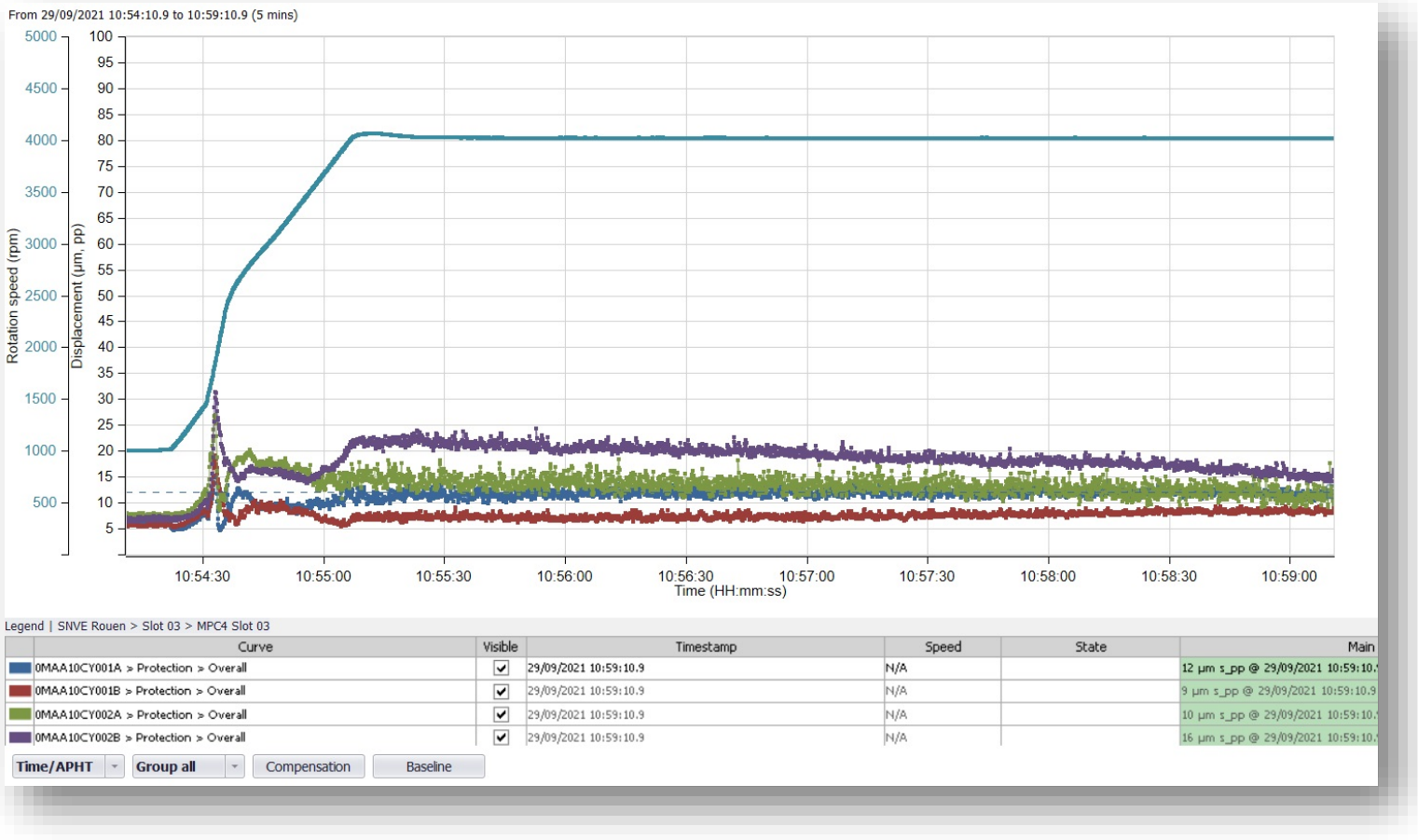
VibroSight Vision screenshot during startup



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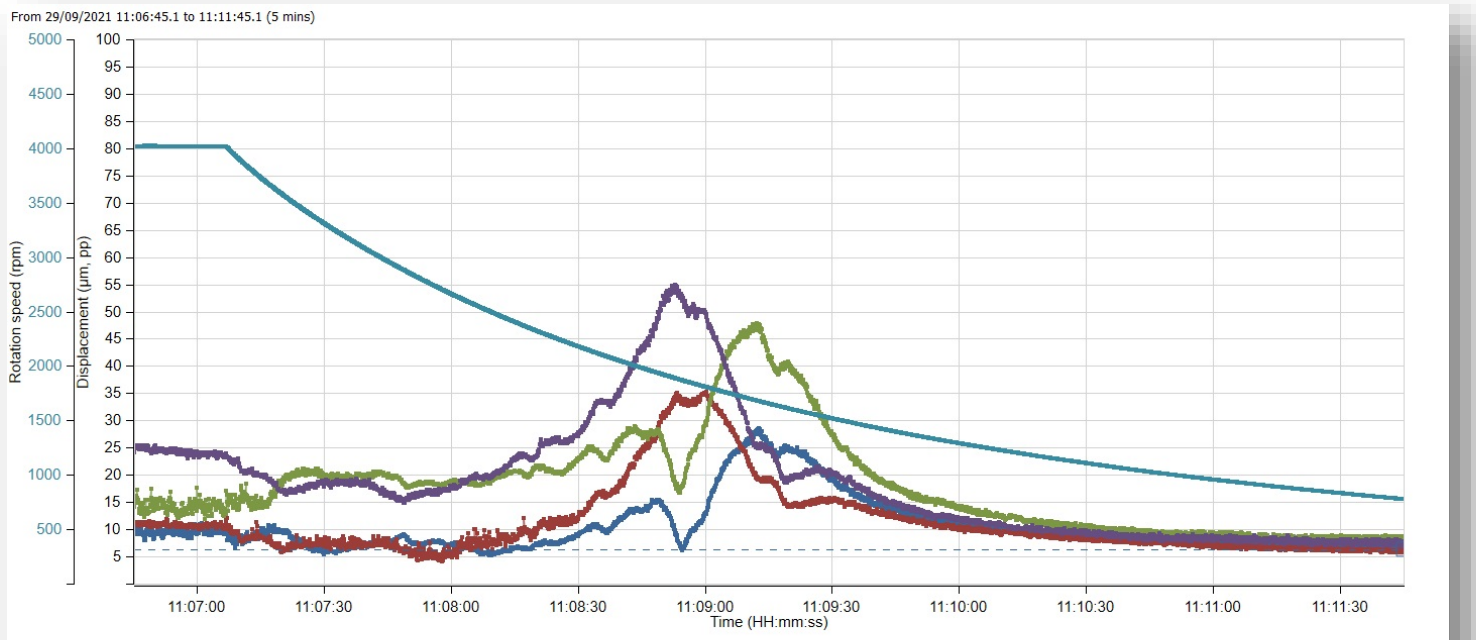
VibroSight Vision screenshot during shutdown



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STEAM TURBINE PROJECT IN FRANCE

Key learnings

Technical

- Overall the software **Protect is very user friendly** and it's display is great
- VibroSight Protect
  - Layout and live data available
  - Possibility to have screenshot of trends, spectrum using only VibroSight Protect and Vision.
- Performance of new card makes really a difference
  - Better signal processing: less noise and larger bandwidth
  - Filters accuracy

Commercial

- Very competitive solution for MPS+CMS
  - Easy upgrade of the firmware to have condition monitoring solution without needing a new card

Retrofit of 2 Francis turbines in Norway

Successful applications

Distributor: IKM

End-user: Statkraft, state owned utility company

Application: Hjartdøla Hydro Power Plant.
Installed capacity: 120 MW, average annual production 410 GW · h

Project: retrofit 2 Francis Turbines.

Scope of supply:

- **6 VM600^{MK2} each one equipped with**
  - MPC4^{MK2} 2 card pairs
  - CPUM^{MK2} 1 card pair
- **Sensors:**
  - 7 Proximity probe TQ402 / IQS900 for relative shaft vibrations and phase reference
  - 1 TQ403 / IQS900 for axial measurement
  - 4 accelerometers (CE620 equivalent) for absolute vibration

Commissioning: August 2021

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RETROFIT OF 2 FRANCIS TURBINES IN NORWAY

Key learnings

Technical

- Up-to-date machine monitoring solution with no risk of obsolescence
- **Axial measurement can be connected to auxiliary channels**, optimizing the use of channels on MPC4Mk2 cards
- Additional relay available for health monitoring of the card and system

Commercial

- Following the success, 6 additional hydro machines will be equipped with VM600Mk2 in Norway, in four other power plants by Q4 21.
- Potential to retrofit older VM600Mk1 installed in more than 70 HPP in Norway
- Future upgrade to CMS in 2022 with VibroSight Capture

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Power gen project in India

Successful applications

Application: BHEL TSGENCO Yadadri (5X800 MW) Thermal Power Project

Project: Turbine Supervisory Instrumentation (5 X 800 MW TG sets)

Scope of supply:

- **10 VM600^{MK2} (2 VM600^{MK2} for each TG). Every TG is equipped with:**
  - MPC4^{MK2} 15 card pairs
  - CPU^{MK2} 2 card pair
  - RLC16^{MK2} 6 modules
  - XMV16 2 modules
- **10 VibroSight server and 5 rulebox:**
- **Sensors:**
  - TQ9xx Series Transducer chains with IPC707 (169 Nos)
  - CAxx6 series transducers (96 Nos)

Commissioning: December 2022

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TURBINE GENERATOR MONITORING FOR SUPERCRITICAL THERMAL PLANT

Key learnings

Technical

- Strong technical specification supporting VM600

i. *Redundant communication with CMS*

ii. *High Temp Sensors*

iii. *Proven track record of our products applied on 800 MW Turbine Generator Set*

- *BHEL-Siemens Strategic relationship for supercritical technology*

Commercial

- Early collaboration since project conceptualisation. Long-term relationship with the end-user from past 10 years
- Meggitt supported BHEL on pricing. Despite competitive advantage, transferred right pricing for the project.
- TSGENCO has engaged with Meggitt in past and visited MSA
- Established regular customer communication, strategic selling, reliable service support and project management capabilities and account management

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MMS upgrade at Smarr Energy Facility – USA

Successful applications

Application: Upgrade machine protection of legacy MMS system to VM600Mk2. Increase channel count with installation of additional TQ900 probes/signal chains. Future plans to add condition monitoring functionality with remote condition monitoring of entire fleet.

Project: Modernize Machine Protection of Qty 2 Siemens V84 GT (Oglethorpe Power site)

Scope of supply:

- **2 VM600^{MK2}**
  - MPC4^{MK2} 5 card pairs
  - Redundant Power Supply

Commissioning: planned for March 2022

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MMS UPGRADE AT SMARR ENERGY FACILITY

Key learnings

Technical

- Integrating existing and new hardware to modernize monitoring solution
- Intend to add Condition Monitoring capabilities in future, ease of upgrade and cost effective

Commercial

- Supporting Utility directly with hardware and services for turnkey solution
- Oglethorpe intends to upgrade fleet of GT facilities and use VibroSight solution to remotely monitor assets

Summary

- Customers worldwide beginning to acknowledge our Strategy….Rip & Replace doesn't make sense
- Mk2 supports a wider variety of applications…v/s Mk1
- Integrated CMS capability in MPC4Mk2 will help gain market share, be more competitive
- One Card Truly does it all….
- Product that is flexible, expandable and probably outlives the plant…
- Quality & Legacy….customers trust in the product & the brand…

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EXPERT ARTICLES
MANAGING BELOW THE ALERT LEVEL

Managing below the alert level

Supplementing your hardware alarms with the right software alarms is condition monitoring approach that "manages by exception"

VibroSight Capabilities

Just because a measurement can originate in the hardware does not mean that its alarm must likewise originate in the hardware. As has been noted, it may be perfectly appropriate to have measurements for which no corresponding hardware alarms have been established. Our VibroSight suite of applications provide an extensive ability to establish alarms on both directly measured and computed variables and so-called "virtual" variables. A virtual variable is one made up of two or more other variables into a composite measurement. One example might be the average of several direct readings. Another might be a variable that looks for the presence of three conditions and is "true" when they are present and "false" when they are not simultaneously present. Users are generally limited only by their imagination based on a very extensive set of mathematical and logical operators within VibroSight.

VibroSight's diagnostic rule box software provides an intuitive user interface that can be used by machinery / process operators – not just machinery specialists. It summarizes the status of all machinery in a collapsible tree hierarchy, uses multiple severity levels for sufficient granularity (six levels) ranging from extreme to none, and provides easily understandable, customizable advisories whenever a machine fault is detected by the system's embedded intelligence.

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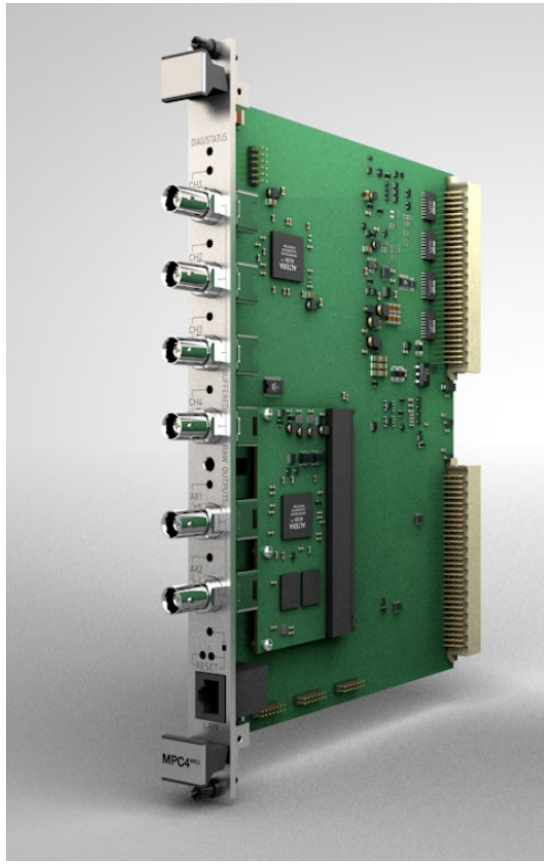
Save the date

WEBINAR IV – VibroSight Capture demonstration



February 2022

Webinar IV

VM600Mk2 technical introduction to CMS

- ✓ **Theme**: Condition monitoring configuration with VibroSight Capture live demo etc
- ✓ **Tool Kit:** technical presentation, demo recording.

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Q&A

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How would you rate today's session?

Go to www.menti.com and use the code **84 23 134**

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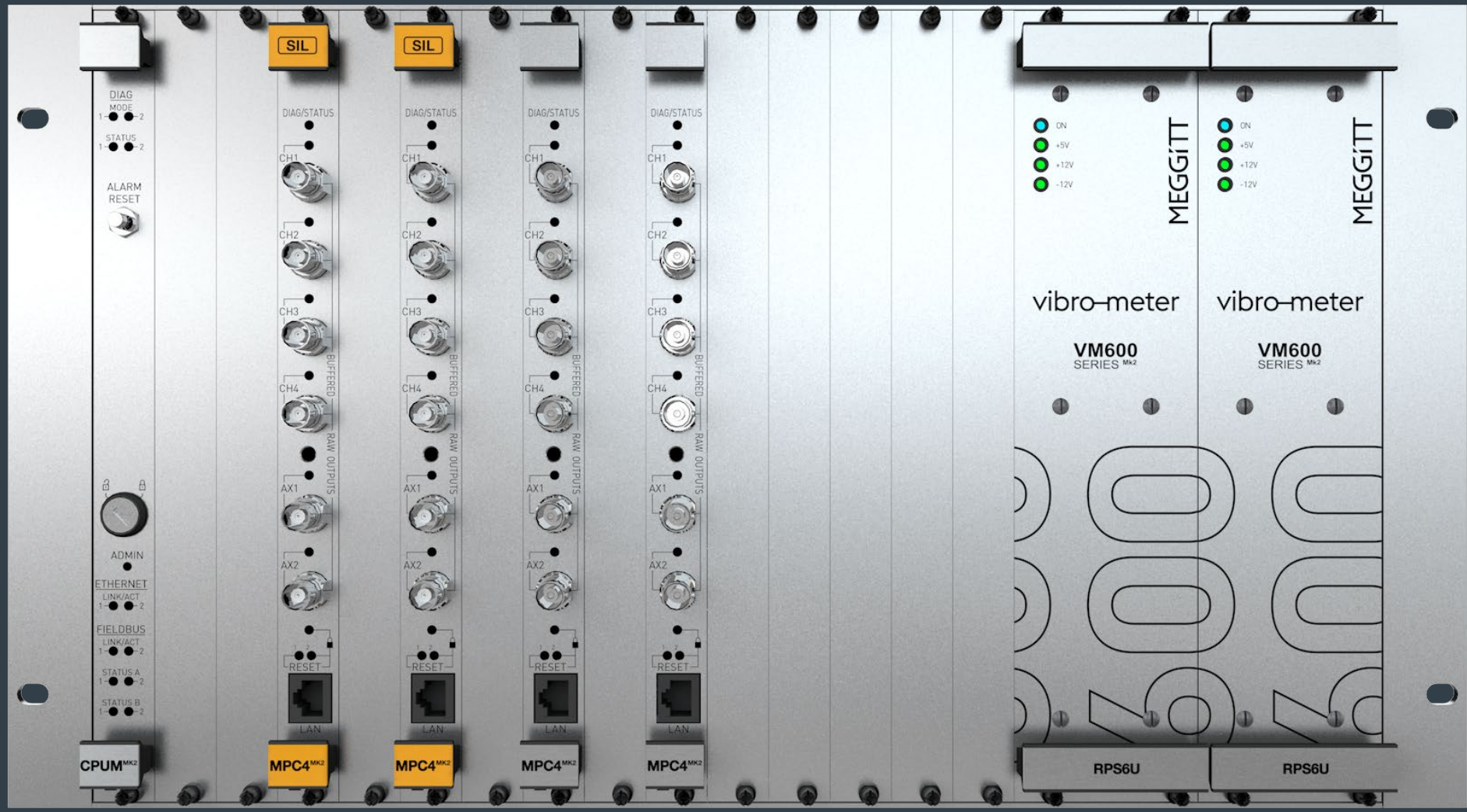
THANK YOU!



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