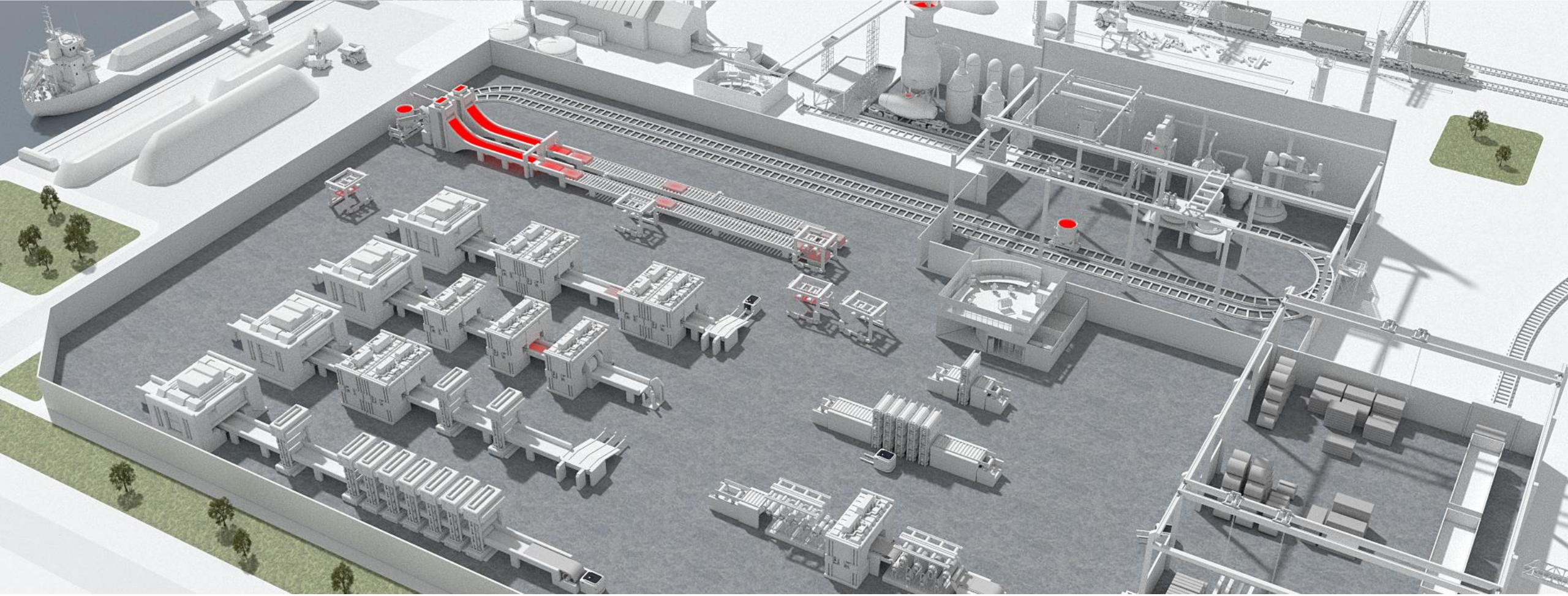


SEPTEMBER 2019

ABB Ability AssetVista

Plant Asset Management Solution

Rafael Margarit, EU Metals Digital Lead

Introduction to

Asset Management

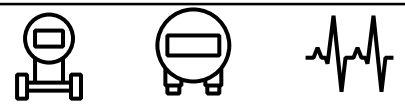
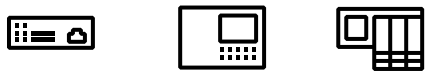
What Types of Assets?

Based on ARC Advisory Group, Plant Asset Management is divided in two assets categories

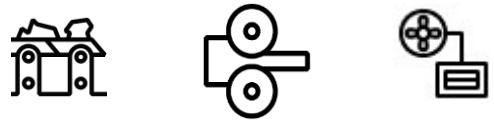
Categories

ARC Advisory Group

Automation Asset

- Instruments Valves, Positioners 
- IT, Switches, servers: 
- Devices with built-in logics: 

Production Assets

- Rotating equipment: 
- Process equipment: 
- Electrical equipment: 

Maintenance strategies

From “run to failure” to “prescriptive”

Advanced maintenance Approaches

Condition-based

– Maintenance based on real time monitoring
several conditions of asset are monitored indicating an upcoming failure is coming

Predictive

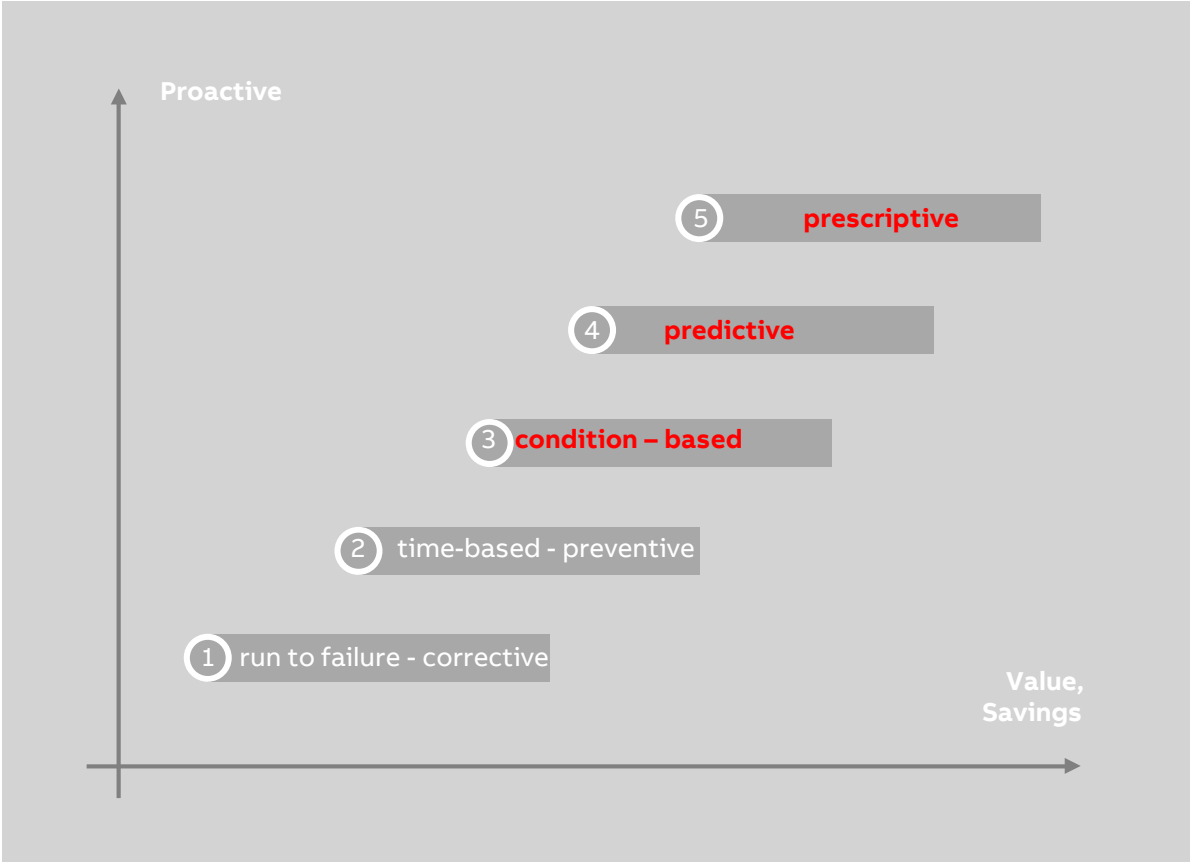
– This includes the evaluation of the consequences of a failure and ensures the right amount of maintenance for the right equipment at the right time

Prescriptive

- One further maintenance strategy is to investigate the options.

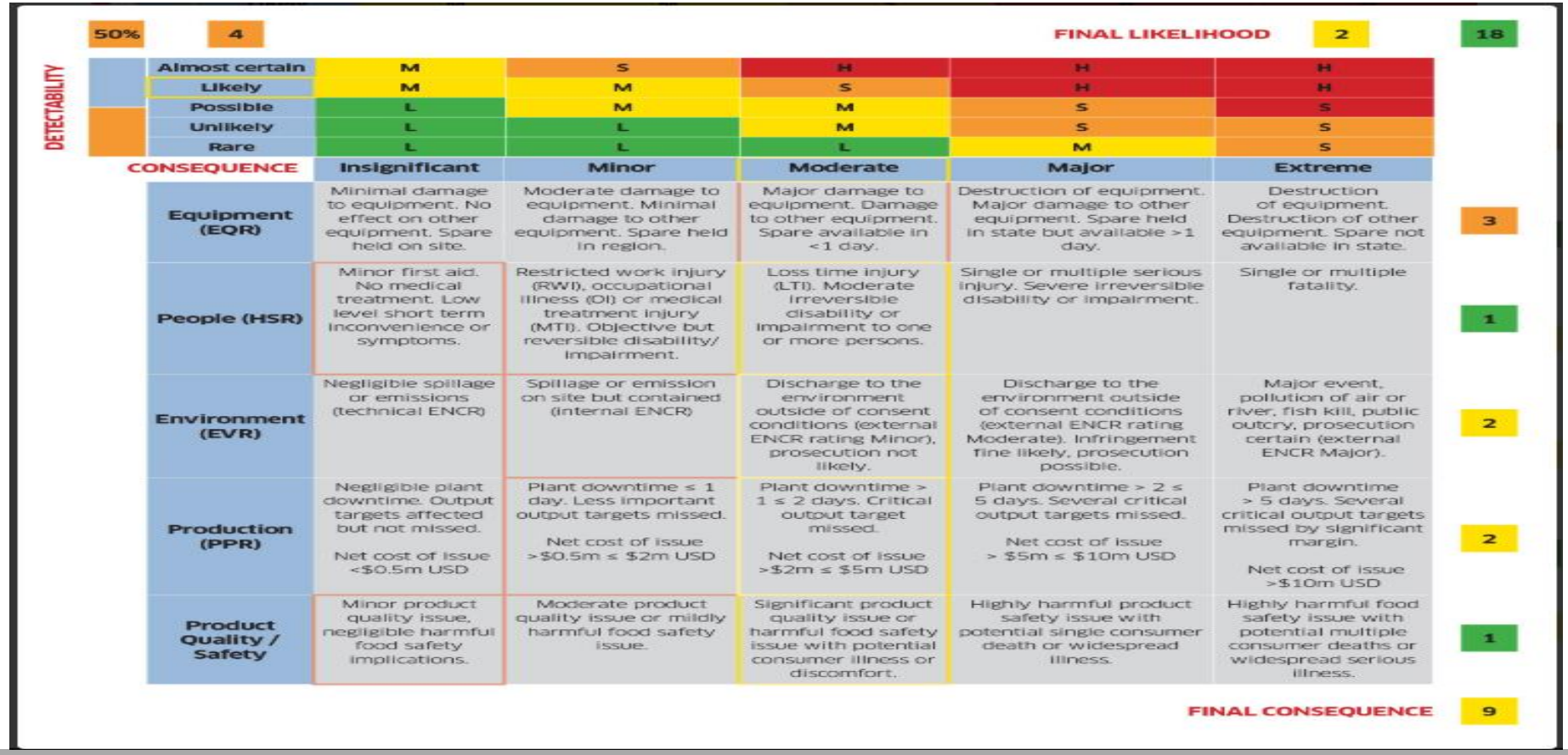
A device that is suffering from reduced health condition may deteriorate slower, if not loaded to full capacity

Implementing the right action to the right time



Maintenance Optimization

From “non essential” to “critical” assets



50%	4				FINAL LIKELIHOOD	2	18
DETECTABILITY	Almost certain	M	S	H	H	H	
	Likely	M	M	S	H	H	
	Possible	L	M	M	S	S	
	Unlikely	L	L	M	S	S	
	Rare	L	L	L	M	S	
	CONSEQUENCE	Insignificant	Minor	Moderate	Major	Extreme	
	Equipment (EQR)	Minimal damage to equipment. No effect on other equipment. Spare held on site.	Moderate damage to equipment. Minimal damage to other equipment. Spare held in region.	Major damage to equipment. Damage to other equipment. Spare available in <1 day.	Destruction of equipment. Major damage to other equipment. Spare held in state but available >1 day.	Destruction of equipment. Destruction of other equipment. Spare not available in state.	3
	People (HSR)	Minor first aid. No medical treatment. Low level short term inconvenience or symptoms.	Restricted work injury (RWI), occupational illness (OI) or medical treatment injury (MTI). Objective but reversible disability/ impairment.	Loss time injury (LTI). Moderate irreversible disability or impairment to one or more persons.	Single or multiple serious injury. Severe irreversible disability or impairment.	Single or multiple fatality.	1
	Environment (EVR)	Negligible spillage or emissions (technical ENCR)	Spillage or emission on site but contained (internal ENCR)	Discharge to the environment outside of consent conditions (external ENCR rating Minor), prosecution not likely.	Discharge to the environment outside of consent conditions (external ENCR rating Moderate). Infringement fine likely, prosecution possible.	Major event, pollution of air or river, fish kill, public outcry, prosecution certain (external ENCR Major).	2
	Production (PPR)	Negligible plant downtime. Output targets affected but not missed. Net cost of issue <$0.5m USD	Plant downtime ≤ 1 day. Less important output targets missed. Net cost of issue >$0.5m ≤ $2m USD	Plant downtime > 1 ≤ 2 days. Critical output target missed. Net cost of issue >$2m ≤ $5m USD	Plant downtime > 2 ≤ 5 days. Several critical output targets missed. Net cost of issue > $5m ≤ $10m USD	Plant downtime > 5 days. Several critical output targets missed by significant margin. Net cost of issue >$10m USD	2
	Product Quality / Safety	Minor product quality issue, negligible harmful food safety implications.	Moderate product quality issue or mildly harmful food safety issue.	Significant product quality issue or harmful food safety issue with potential consumer illness or discomfort.	Highly harmful product safety issue with potential single consumer death or widespread illness.	Highly harmful food safety issue with potential multiple consumer deaths or widespread serious illness.	1
						FINAL CONSEQUENCE	9

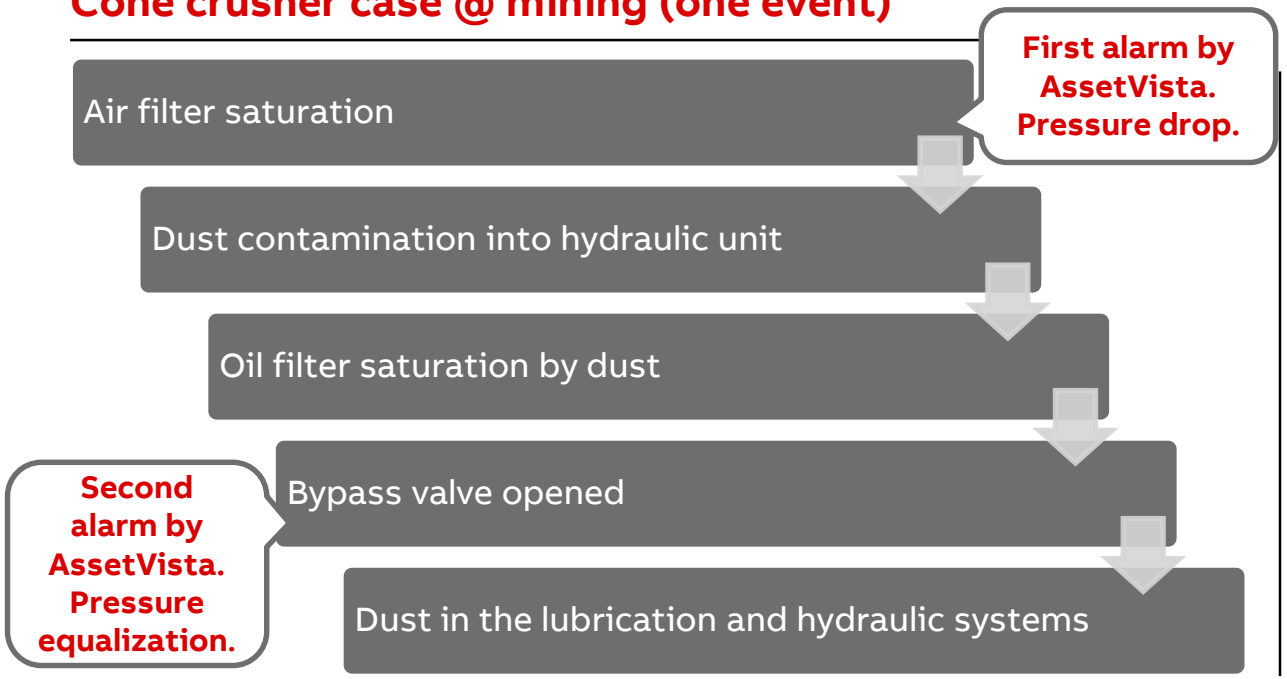
Asset Criticality Ranking – Focus where it’s needed

https://www.maintworld.com/Asset-Management/The-criticality-spectrum-a-means-to-focus-our-attention-where-it-is-warranted

Why Plant Asset Management (PAM)?

Can I save money monitoring the health of my assets?

Cone crusher case @ mining (one event)



Production Savings (avoided shutdown)

Downtime: 08 hours

Hourly production: 4.000t/h

Contribution margin per ton.: 15USD

Savings: 8 X 4.000 X 15 = 480.000 USD

Repair Savings

At least 120.000 USD in parts and man-hours

Total estimated saving: 600kUSD in a single event

Asset Management Solution for Process Industries

ABB Ability AssetVista

The AssetVista

User friendly intuitive interfaces, multiple arrangements with detailed info

Definition and purpose

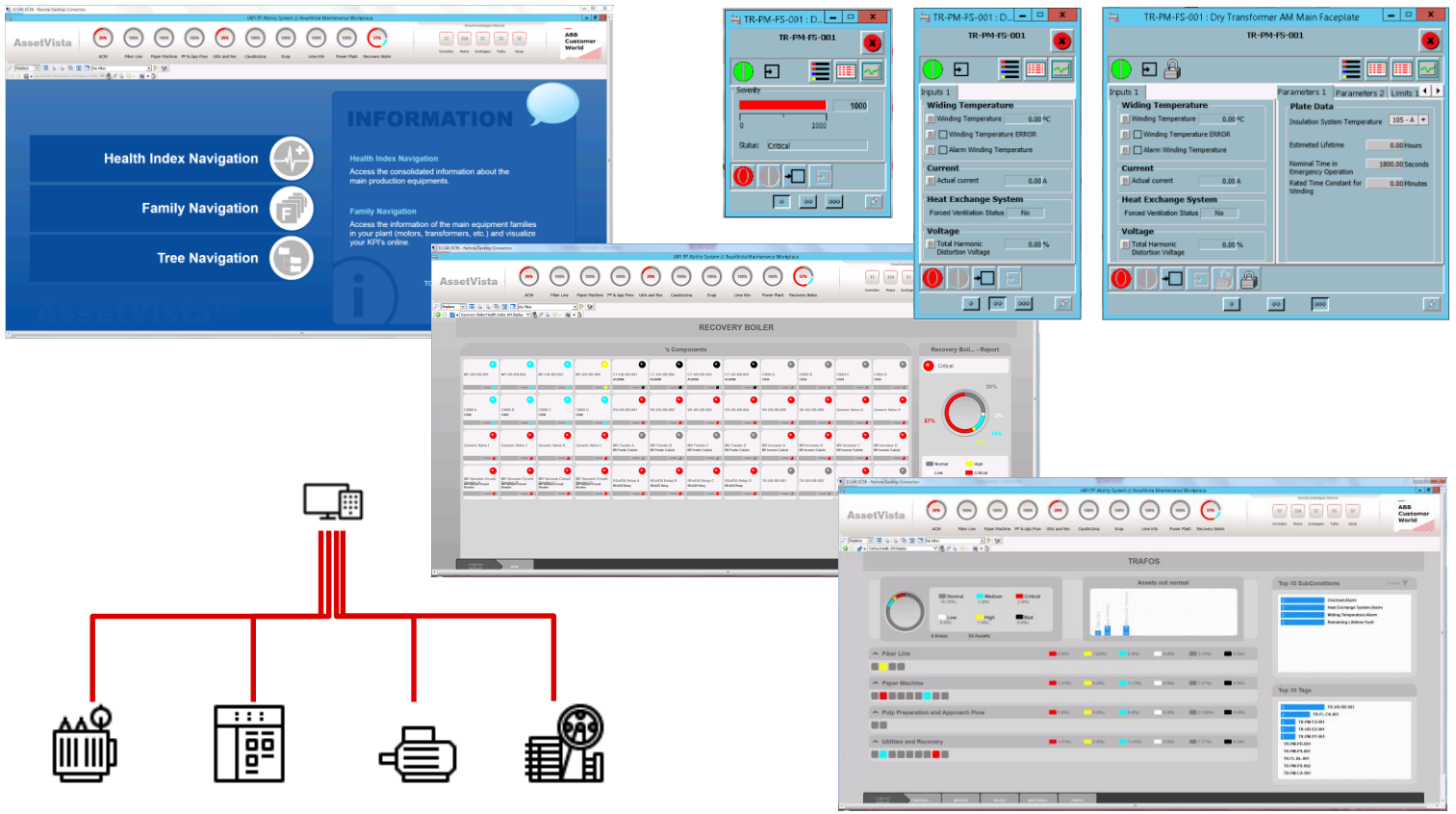
Maintenance data in user-friendly **dashboards** for a faster and accurate decision-making process

Identify potential failures either **periodically or in real-time** before they affect the productivity

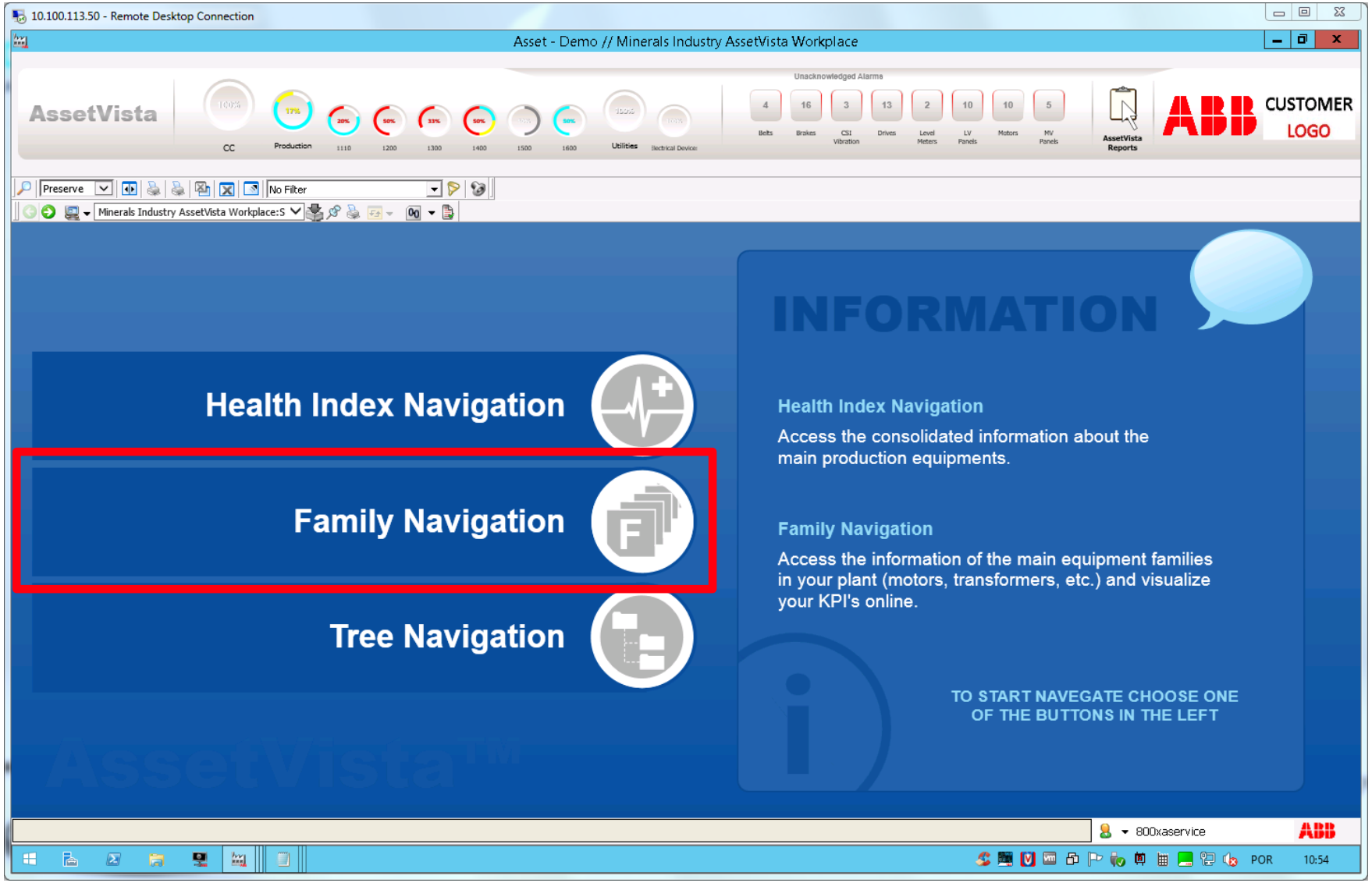
Periodic reports support your maintenance team with **direct** and detailed **asset information**

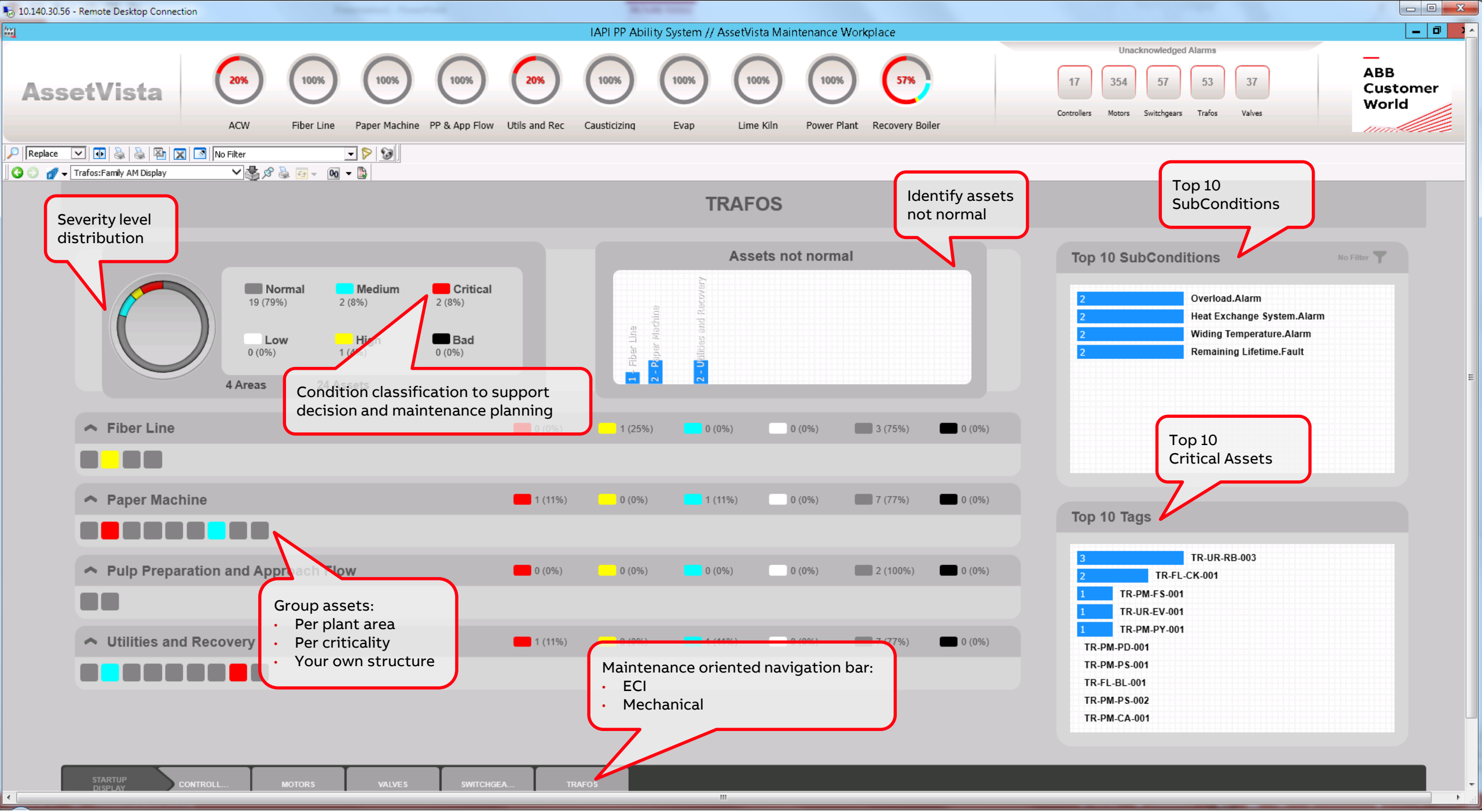
Easy-to-use **root cause analysis** allows a **quick fail detection** and reduces production losses

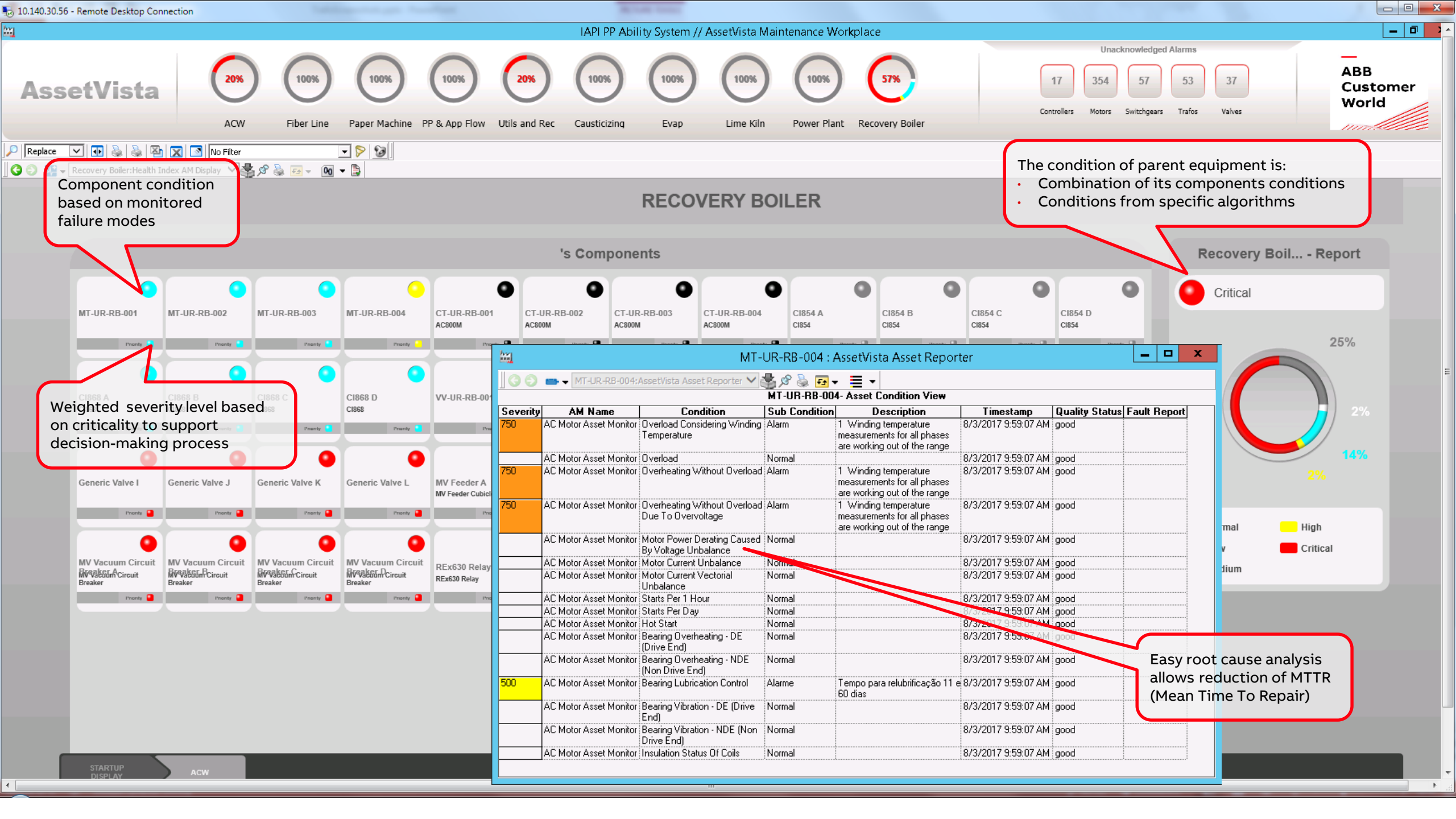
Asset management solution address **to all type of assets**



Maintenance Workplace



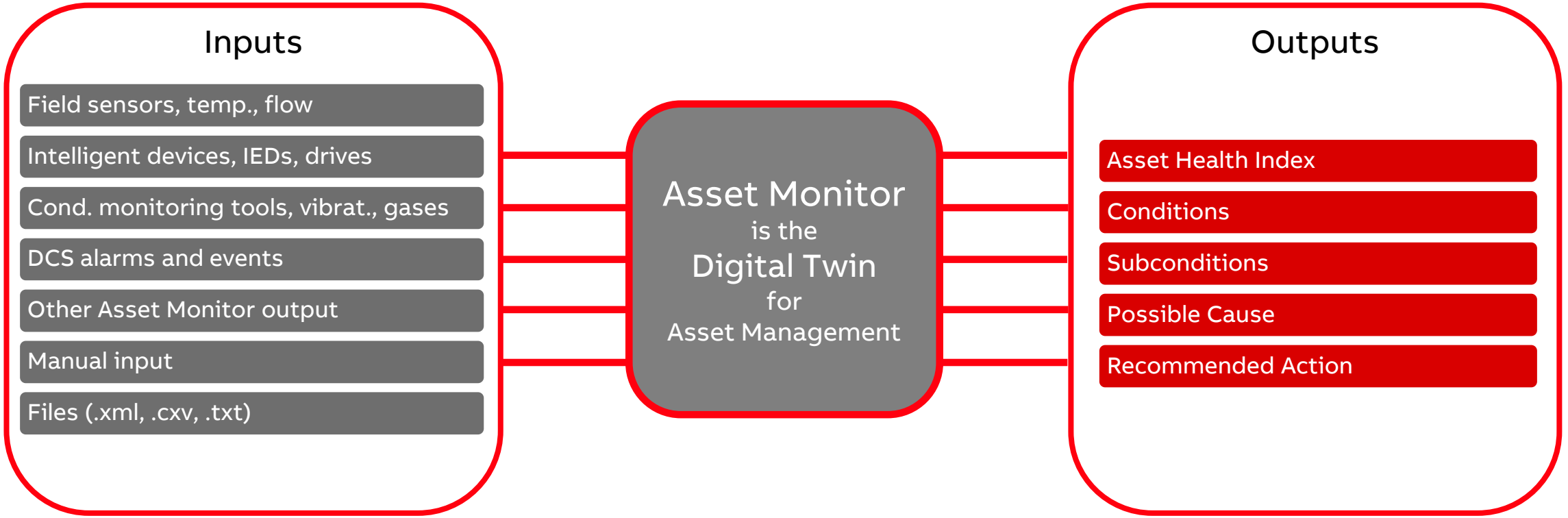

10.140.30.56 - Remote Desktop Connection
IAPI PP Ability System // AssetVista Maintenance Workplace
AssetVista
ACW 20%
Fiber Line 100%
Paper Machine 100%
PP & App Flow 100%
Utils and Rec 20%
Causticizing 100%
Evap 100%
Lime Kiln 100%
Power Plant 100%
Recovery Boiler 57%
Unacknowledged Alarms
Controllers 17
Motors 354
Switchgears 57
Trafos 53
Valves 37
ABB Customer World
Replace
No Filter
Trafos:Family AM Display
TRAFOS
Severity level distribution
Normal 19 (79%)
Medium 2 (8%)
Critical 2 (8%)
Low 0 (0%)
Bad 0 (0%)
4 Areas
Condition classification to support decision and maintenance planning
Identify assets not normal
Assets not normal
1 - Fiber Line
2 - Paper Machine
2 - Utilities and Recovery
Top 10 SubConditions
No Filter
2 Overload.Alarm
2 Heat Exchange System.Alarm
2 Widing Temperature.Alarm
2 Remaining Lifetime.Fault
Top 10 Critical Assets
Top 10 Tags
3 TR-UR-RB-003
2 TR-FL-CK-001
1 TR-PM-FS-001
1 TR-UR-EV-001
1 TR-PM-PY-001
TR-PM-PD-001
TR-PM-PS-001
TR-FL-BL-001
TR-PM-PS-002
TR-PM-CA-001
Fiber Line
1 (25%) 0 (0%) 0 (0%) 3 (75%) 0 (0%)
Paper Machine
1 (11%) 0 (0%) 1 (11%) 0 (0%) 7 (77%) 0 (0%)
Pulp Preparation and Approach Flow
0 (0%) 0 (0%) 0 (0%) 0 (0%) 2 (100%) 0 (0%)
Utilities and Recovery
1 (11%)
Group assets:
• Per plant area
• Per criticality
• Your own structure
Maintenance oriented navigation bar:
• ECI
• Mechanical
STARTUP DISPLAY
CONTROLL...
MOTORS
VALVES
SWITCHGEA...
TRAFOS



Severity	AM Name	Condition	Sub Condition	Description	Timestamp	Quality Status	Fault Report
750	AC Motor Asset Monitor	Overload Considering Winding Temperature	Alarm	1 Winding temperature measurements for all phases are working out of the range	8/3/2017 9:59:07 AM	good	
	AC Motor Asset Monitor	Overload	Normal		8/3/2017 9:59:07 AM	good	
750	AC Motor Asset Monitor	Overheating Without Overload	Alarm	1 Winding temperature measurements for all phases are working out of the range	8/3/2017 9:59:07 AM	good	
750	AC Motor Asset Monitor	Overheating Without Overload Due To Overvoltage	Alarm	1 Winding temperature measurements for all phases are working out of the range	8/3/2017 9:59:07 AM	good	
	AC Motor Asset Monitor	Motor Power Derating Caused By Voltage Unbalance	Normal		8/3/2017 9:59:07 AM	good	
	AC Motor Asset Monitor	Motor Current Unbalance	Normal		8/3/2017 9:59:07 AM	good	
	AC Motor Asset Monitor	Motor Current Vectorial Unbalance	Normal		8/3/2017 9:59:07 AM	good	
	AC Motor Asset Monitor	Starts Per 1 Hour	Normal		8/3/2017 9:59:07 AM	good	
	AC Motor Asset Monitor	Starts Per Day	Normal		8/3/2017 9:59:07 AM	good	
	AC Motor Asset Monitor	Hot Start	Normal		8/3/2017 9:59:07 AM	good	
	AC Motor Asset Monitor	Bearing Overheating - DE (Drive End)	Normal		8/3/2017 9:59:07 AM	good	
	AC Motor Asset Monitor	Bearing Overheating - NDE (Non Drive End)	Normal		8/3/2017 9:59:07 AM	good	
500	AC Motor Asset Monitor	Bearing Lubrication Control	Alarme	Tempo para relubrificação 11 e 60 dias	8/3/2017 9:59:07 AM	good	
	AC Motor Asset Monitor	Bearing Vibration - DE (Drive End)	Normal		8/3/2017 9:59:07 AM	good	
	AC Motor Asset Monitor	Bearing Vibration - NDE (Non Drive End)	Normal		8/3/2017 9:59:07 AM	good	
	AC Motor Asset Monitor	Insulation Status Of Coils	Normal		8/3/2017 9:59:07 AM	good	

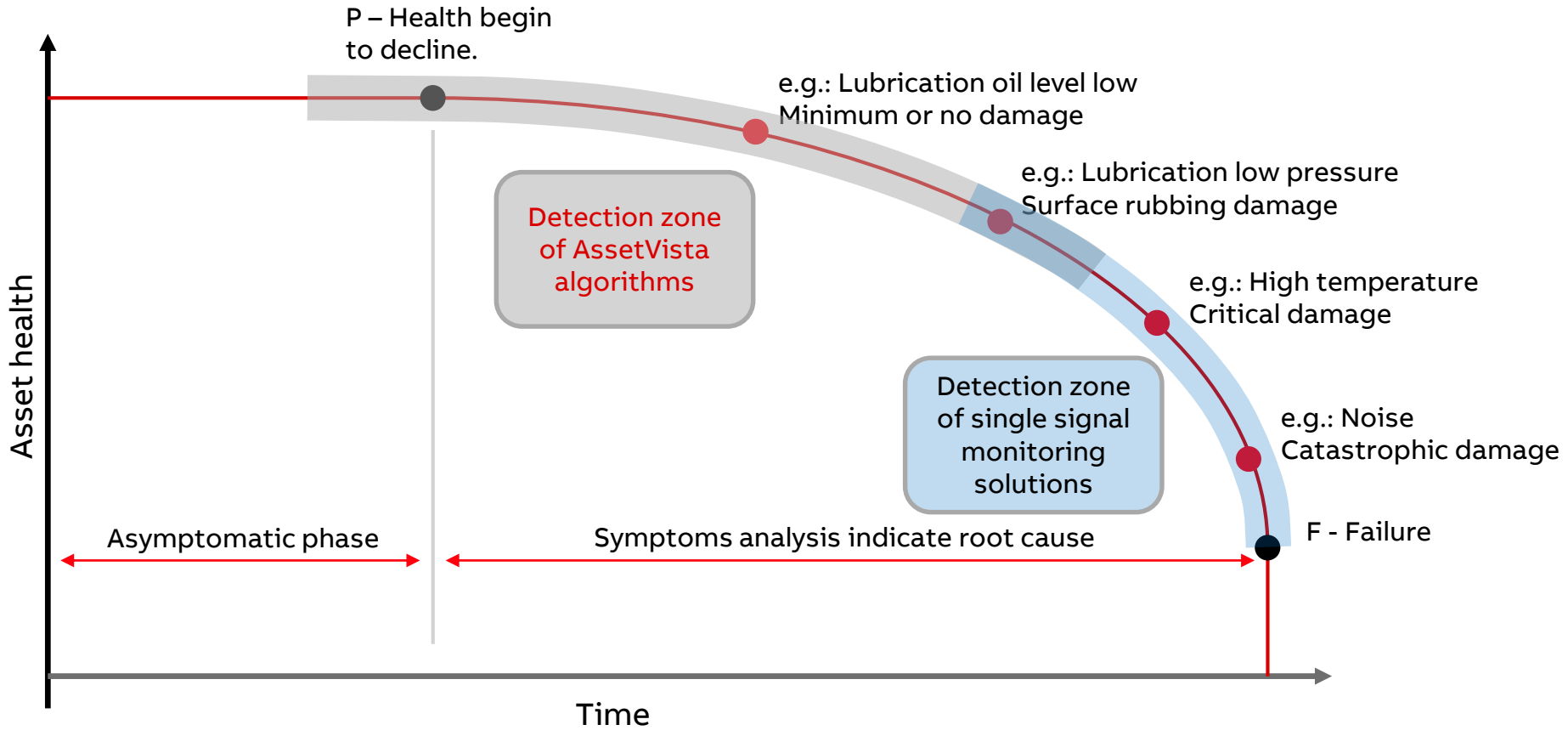
The Digital Twin to monitor the health of physical assets

Asset Monitors enables the Asset Management perspective



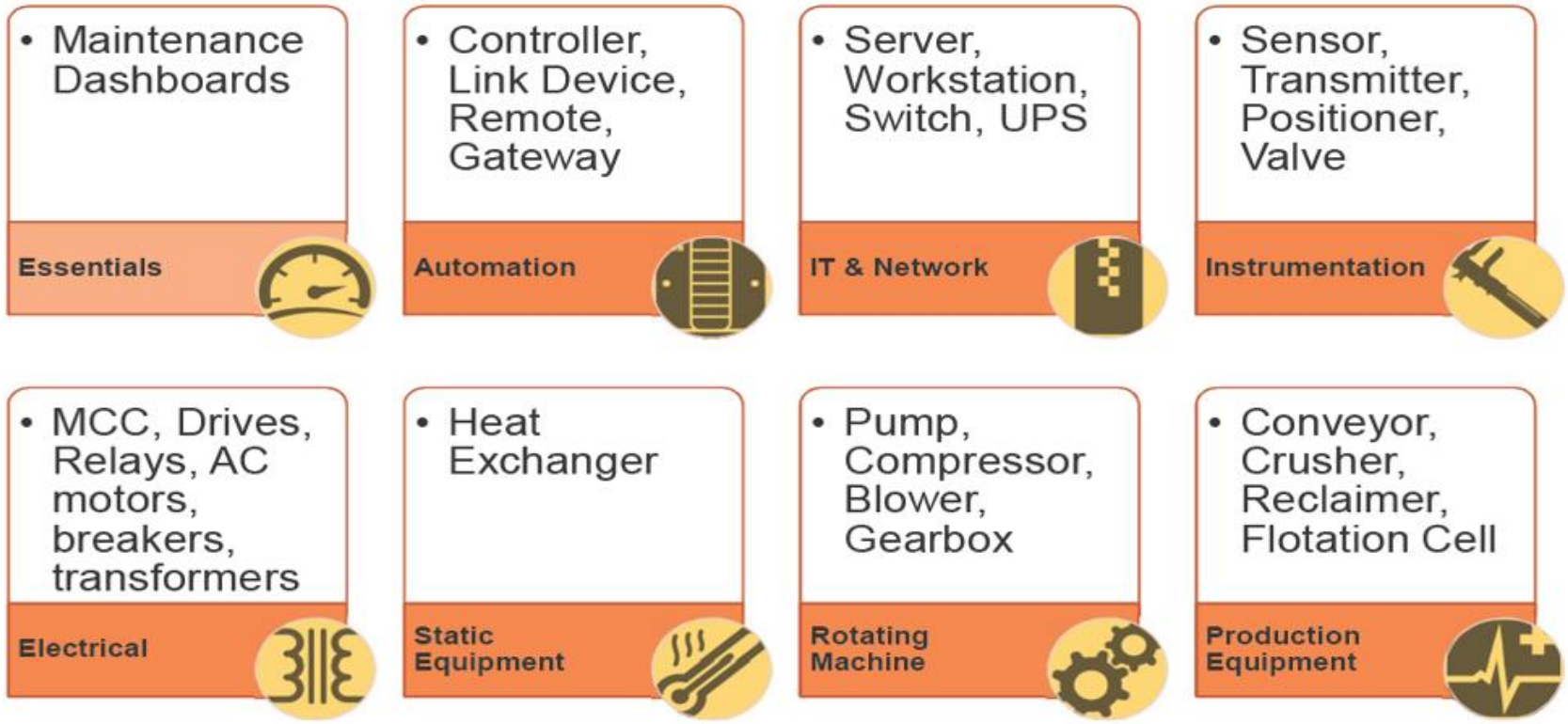
AssetVista Digital Twins in P-F Curve

Due its asset-centric, multi-parameters monitoring algorithms, AV detects symptoms earlier.



AssetVista Library Suite

Monitoring Packages



Condition Monitoring Objects Libraries for each type of assets

Asset Monitors Library

Electrical Equipment

Electrical

Equipment Type	Model	Ver.
Motor - AC	Generic	V.2.1.8
Motor - DC	Generic	V.2.1.6
Variable Speed Drive	ABB ACS2000	V.2.1.6
Variable Speed Drive	ABB ACS800	V.2.1.6
Variable Speed Drive	ABB ACS880	V.2.1.5
Transformer - Dry	Generic	V.2.1.6
Meter - Power and Energy	ION7x50	V.2.0.0
Circuit Breaker - LV	Generic	V.2.0.0
Column - Feeder - LV	Generic	V.2.0.0
Column - Incomer - LV	Generic	V.2.0.0

Electrical

Equipment Type	Model	Ver.
Relay	MControl / MStart	V.2.1.7
Contactor - MV	Generic	V.2.0.0
Cubicle - Feeder - MV	Generic	V.2.0.0
Cubicle - Incomer - MV	Generic	V.2.0.0
Circuit Breaker - MV - Vacuum	Generic	V.2.0.0
Transformer - Oil Immersed	Generic	V.2.1.0
Variable Speed Drive	Powerflex 7000	V.2.0.0
Relay	ABB - REx615	V.2.0.0
Relay	ABB - REx630	V.2.0.0

Asset Monitors Library

Mechanical and Process Specific Assets

Mechanical

Equipment Type	Model	Ver.
Brake - Electromagnetic	Generic	V.2.1.6
Gearbox	Generic	V.2.0.0
Brake - Hydraulic	Generic	V.2.1.5
Hydraulic Unit	Generic	V.2.1.1
Lubrication Unit	Generic	V.2.0.0
Oil Tank	Generic	V.2.0.0

Process (mining and pulp and paper)

Equipment Type	Model	Ver.
Bridge Type Scraper Reclaimer	Specific model	V.2.0.0
Crusher - Cone	Specific model	V.2.1.6
Vibrating Screen	Specific model	V.2.1.2
Vibrating Screen - Double	Specific model	V.2.1.2
Woodchips Digester	Specific model	V.2.1.2
Woodchips Feeder	Specific model	V.2.1.2

Asset Monitors Library

Automation, Instrumentation and Vibration systems

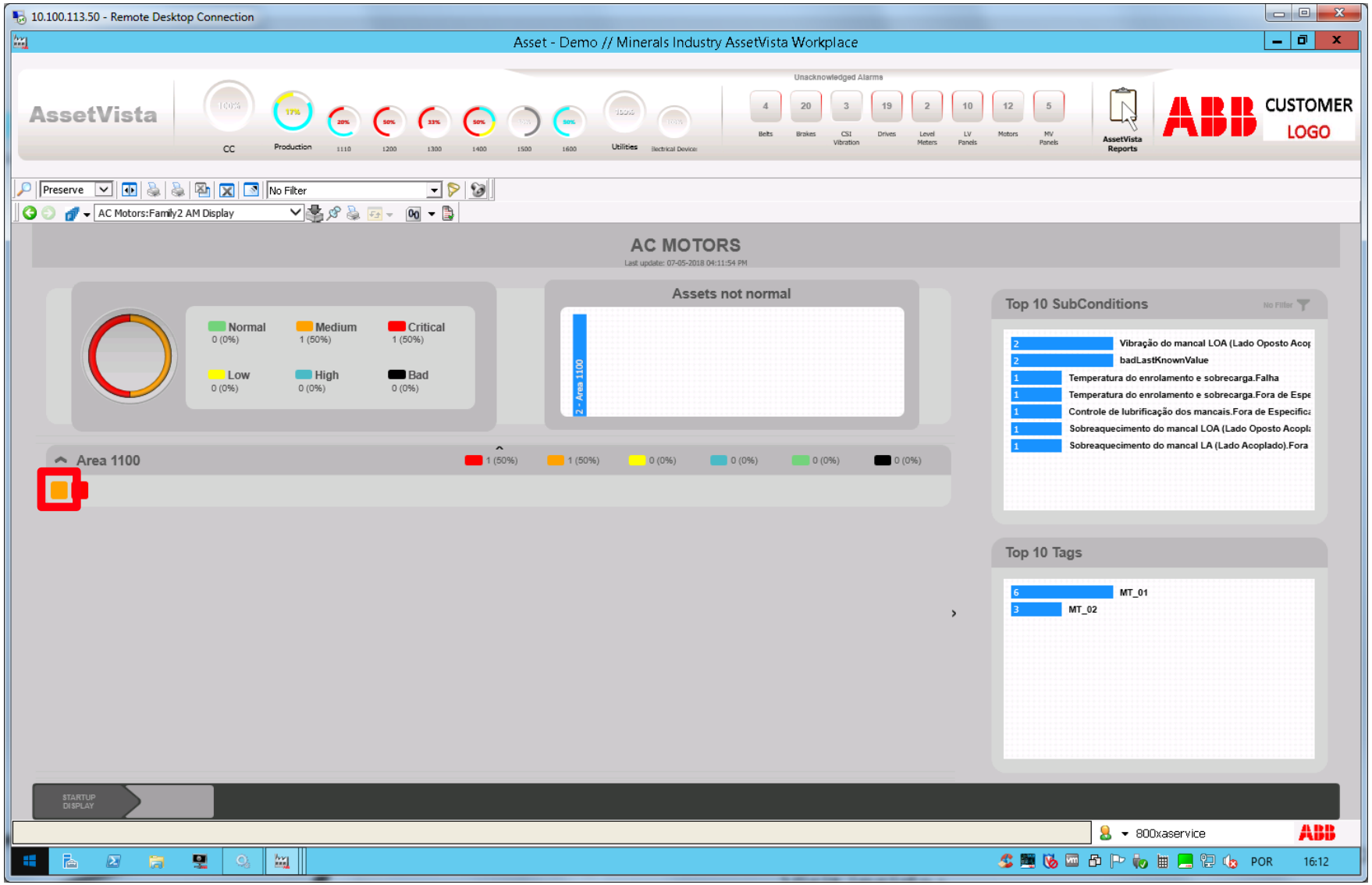
Automation & Instrumentation

Equipment Type	Model	Ver.
Controller	ABB - AC800M	V.2.0.0
Communication Interface	ABB - CI854	V.2.0.0
Communication Interface	ABB - CI 868	V.2.0.0
Communication Module	ABB - MLink	V.2.1.5
Valve	Generic	V.2.1.2
Ultrasonic Level Sensor	Hawk - Sultan 2	V.2.0.0

Vibration

Equipment Type	Model	Ver.
Pulley (drive) - Vibration	Generic - CSI	V.2.0.0
Vibration Collector	Emerson CSI	V.2.0.0
Motor - Vibration	Generic - CSI	V.2.0.0
Gearbox - Orthogonal Axis - Vib.	Generic - CSI	V.2.0.0
Gearbox - Parallel Axis - Vib.	Generic - CSI	V.2.0.0
Gearbox - Planetary Axis - Vib.	Generic - CSI	V.2.0.0
Pulley - Vibration	Generic - CSI	V.2.0.0
Vibrating Screen - Vibration	Generic - CSI	V.2.0.0
Vibration Interface 12 & 24ch	Emerson CSI - 12ch	V.2.0.0

Component Navigation Mode (Production Zone Split)



Faceplate (asset-centric detailed info and data) and Asset Reporter (conditions and severity details)

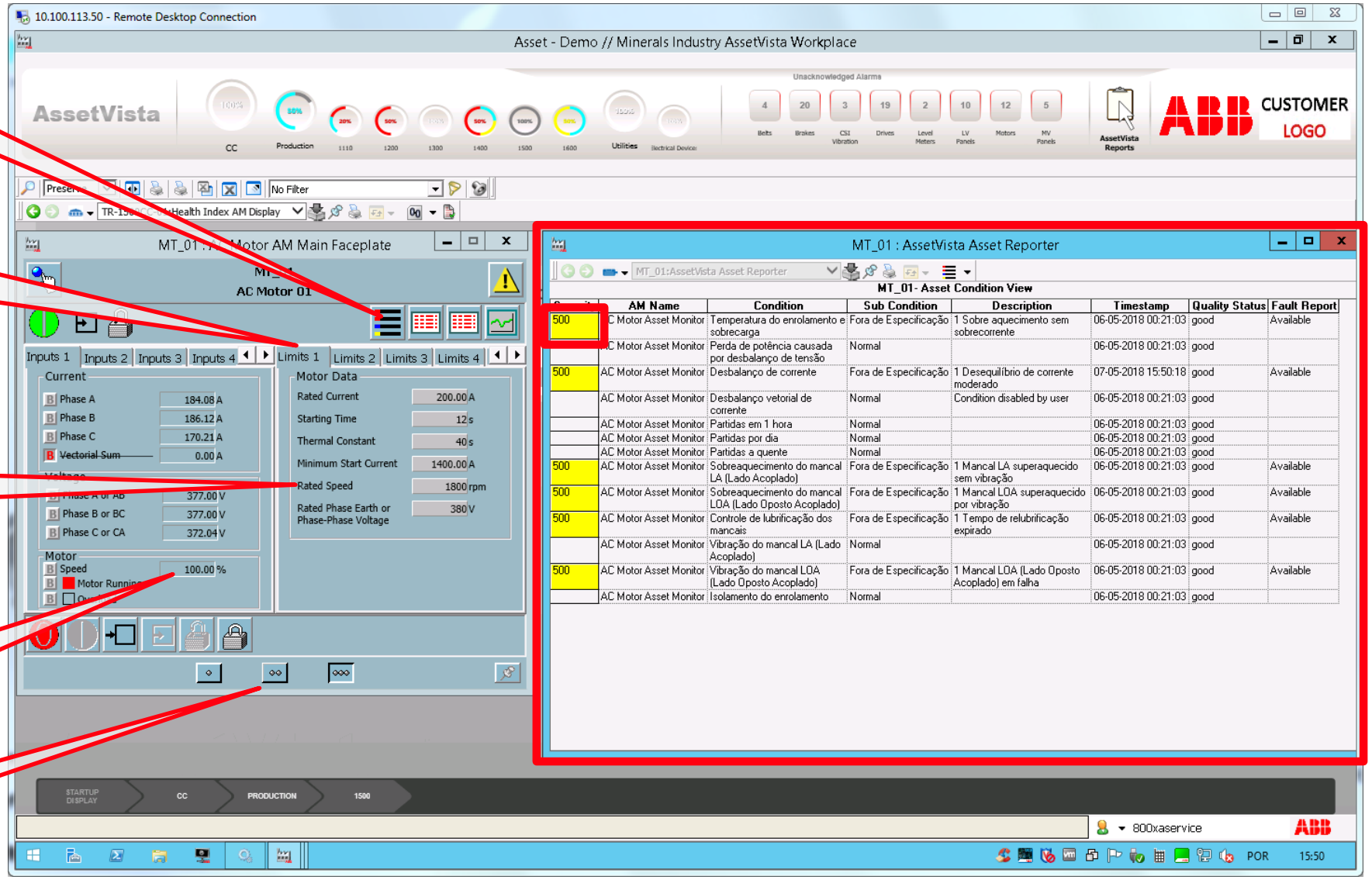
Assess events, alarms and trends

Set different limits according to the criticality level

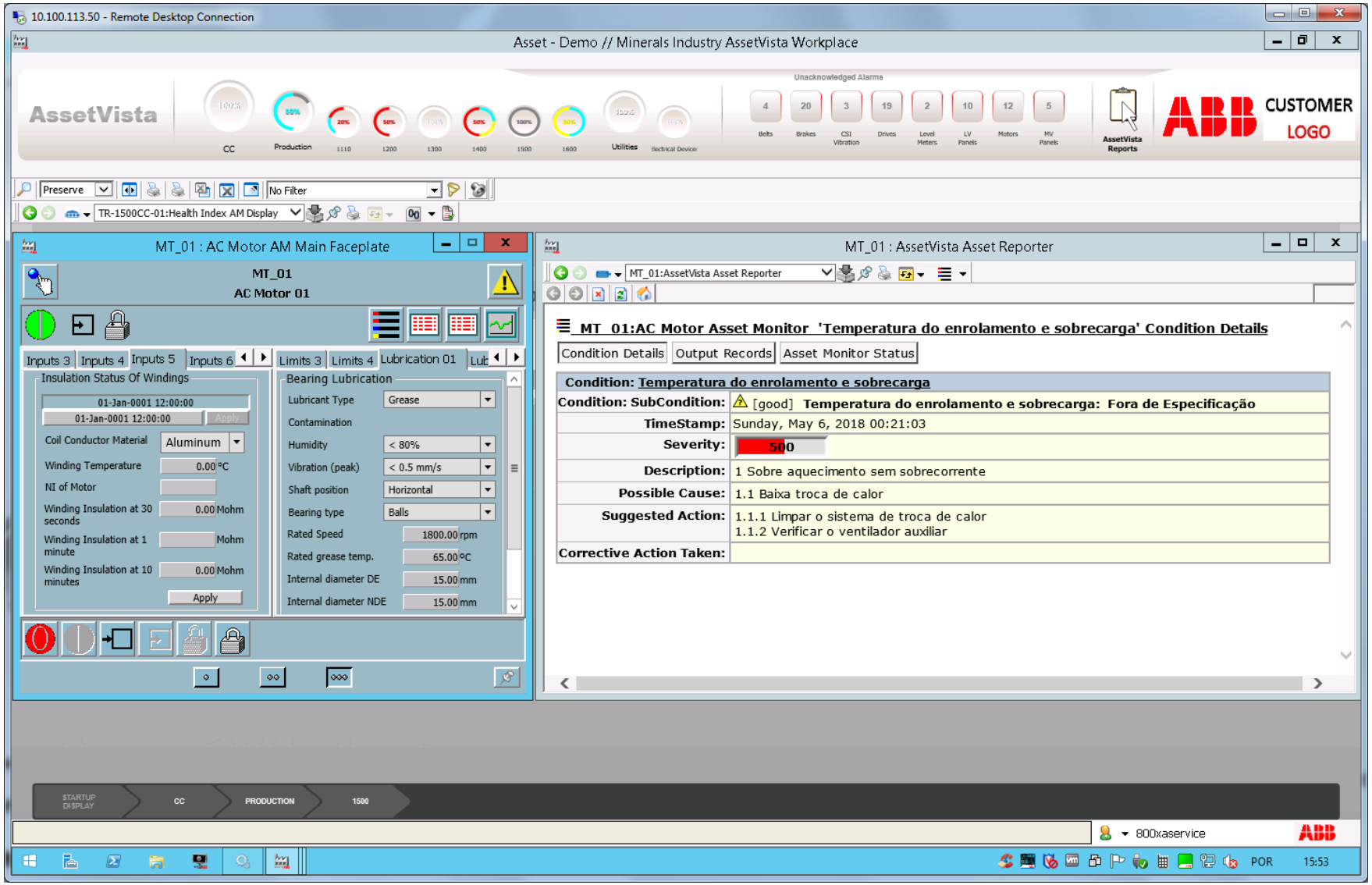
Easy to set equipment parameters

Real time field data.

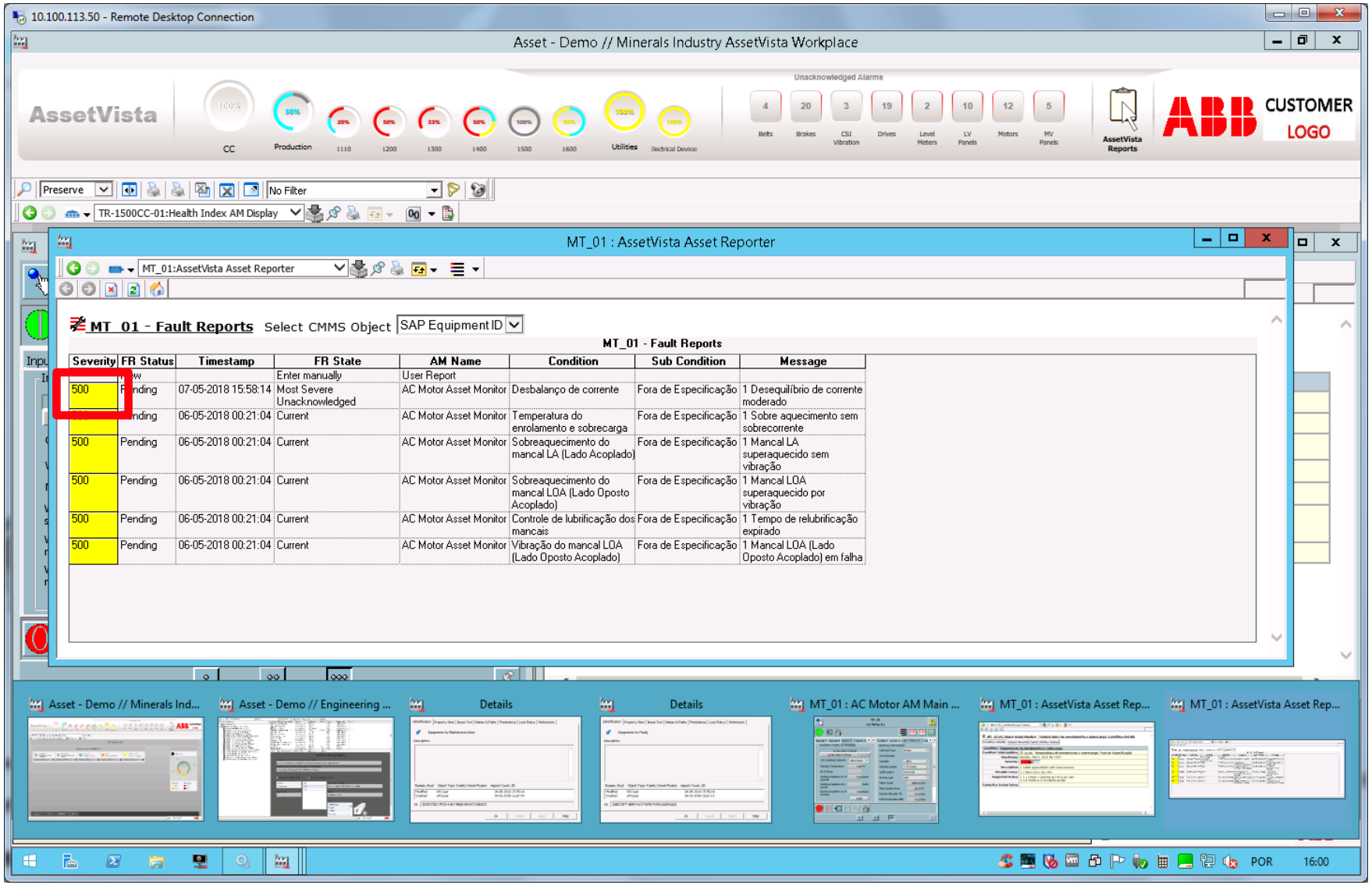
Three visualization modes



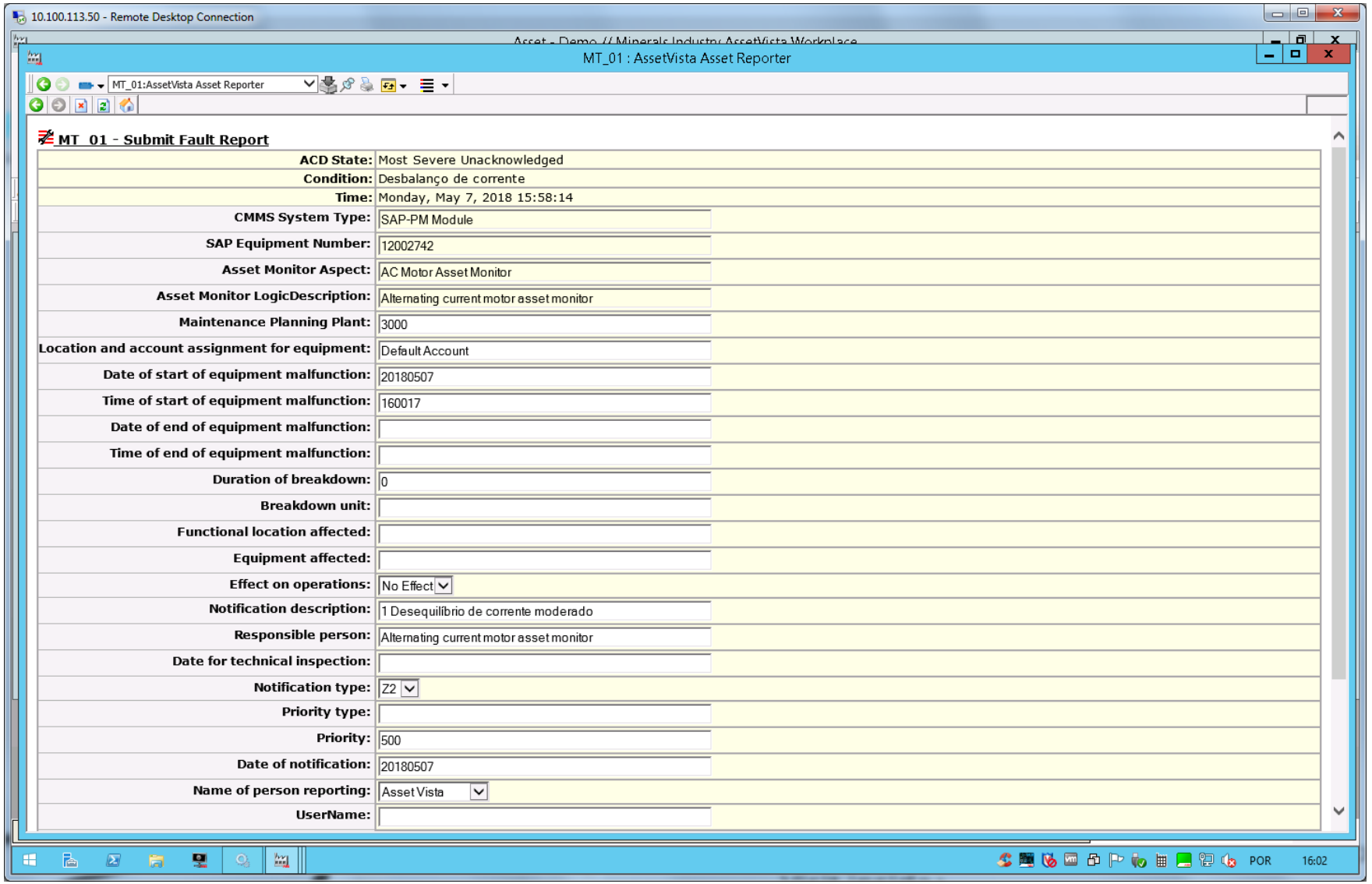
Faceplate (asset-centric detailed info and data) and Asset Reporter (conditions and severity details)



Fault Report Submitter to ERP / CMMS System

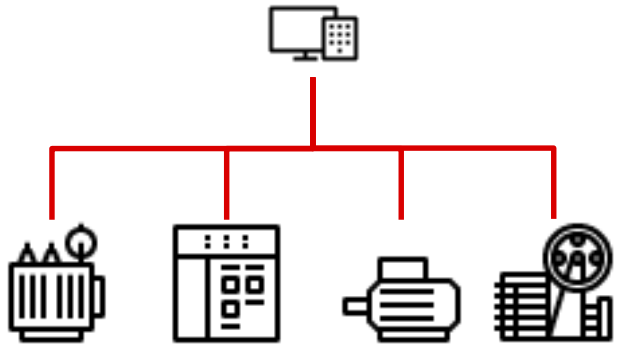


Fault Report Submitter Form (auto-filled and customized fields)

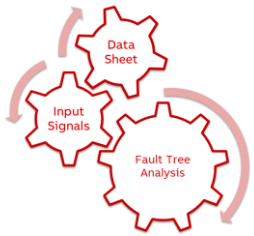


Improves maintenance routine and strategy

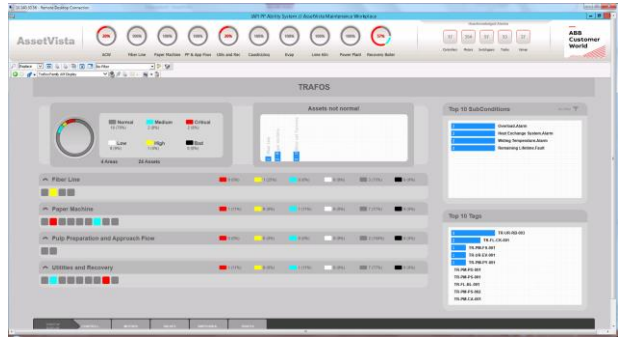
Continuous improvement cycle



Field Data and Specifications



Algorithms



Dashboards

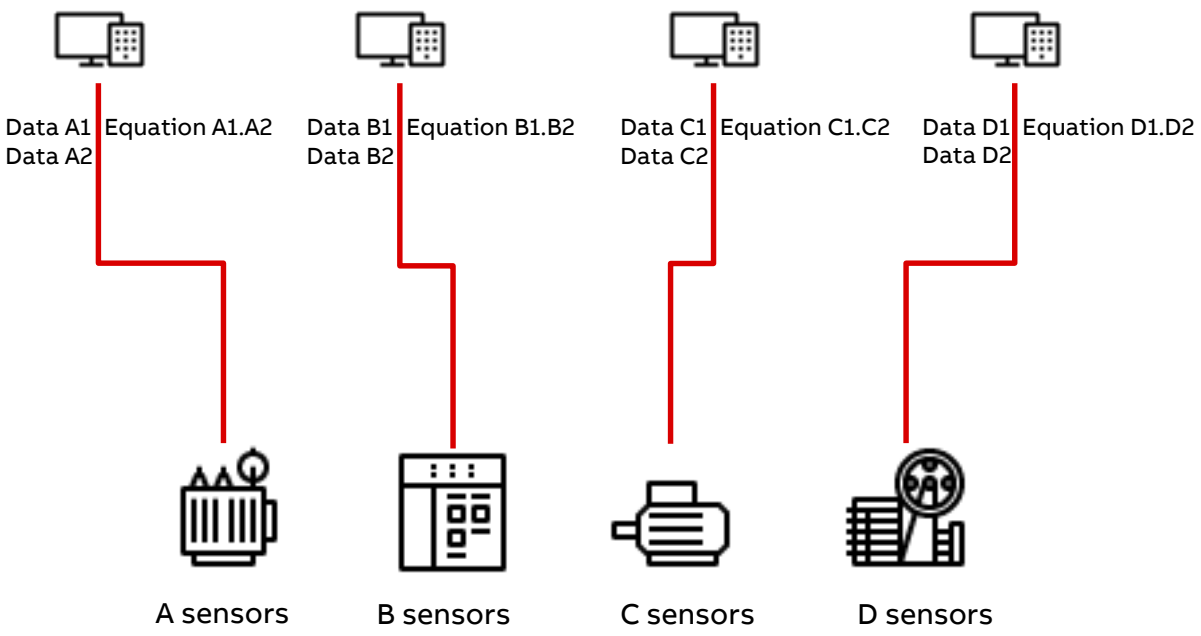
Maintenance Plan and Programming

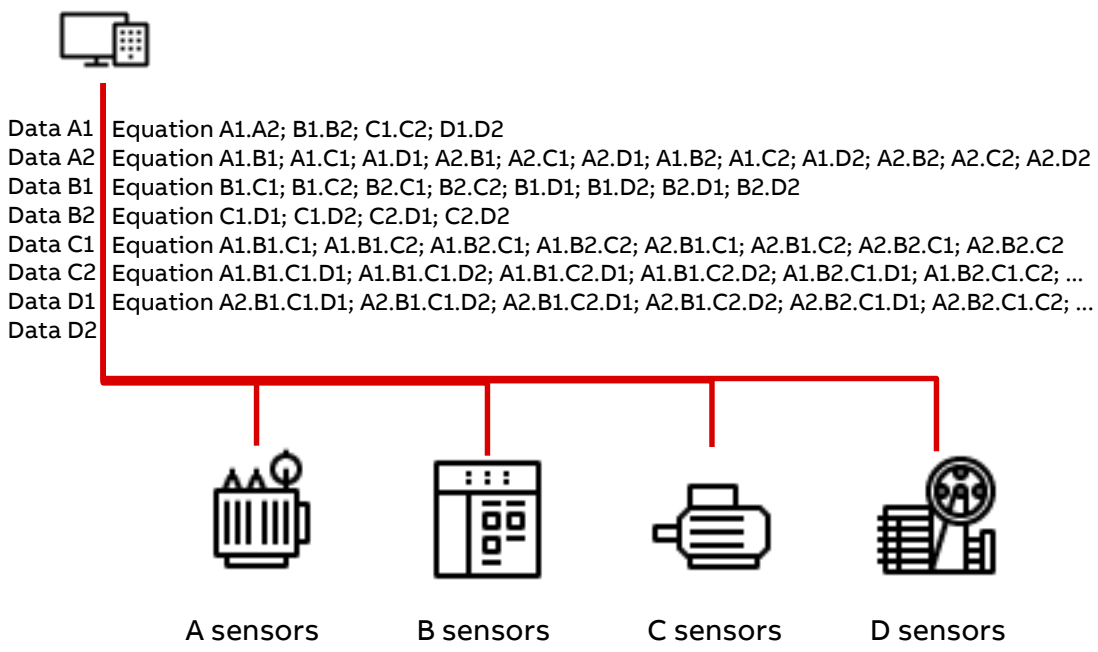
Repair

Maintenance Strategy

Multiple data sources combined in one single place

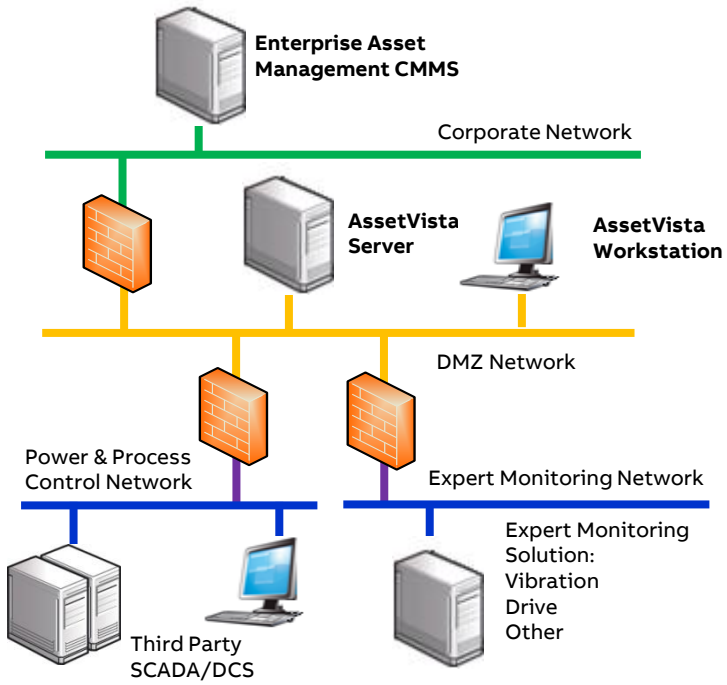
More variables, more equations and more results



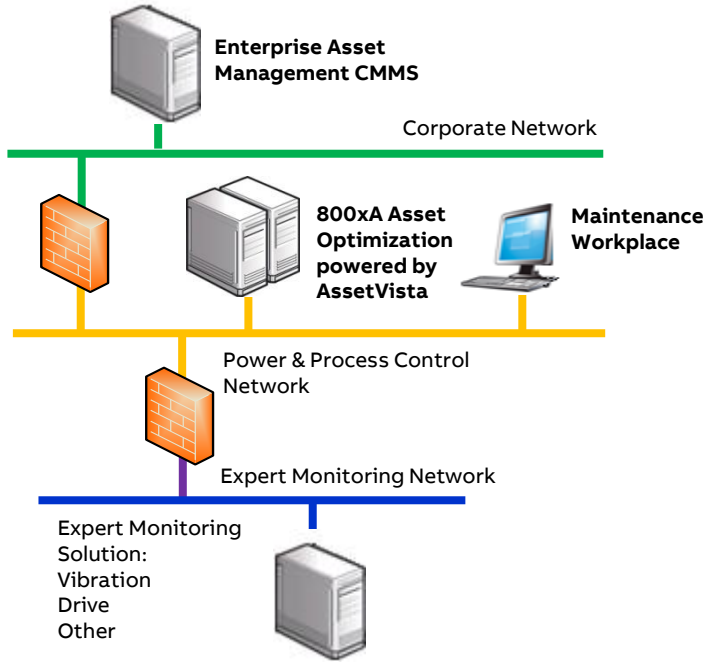


Connect to any kind of OPC interface

ABB or non-ABB installed base



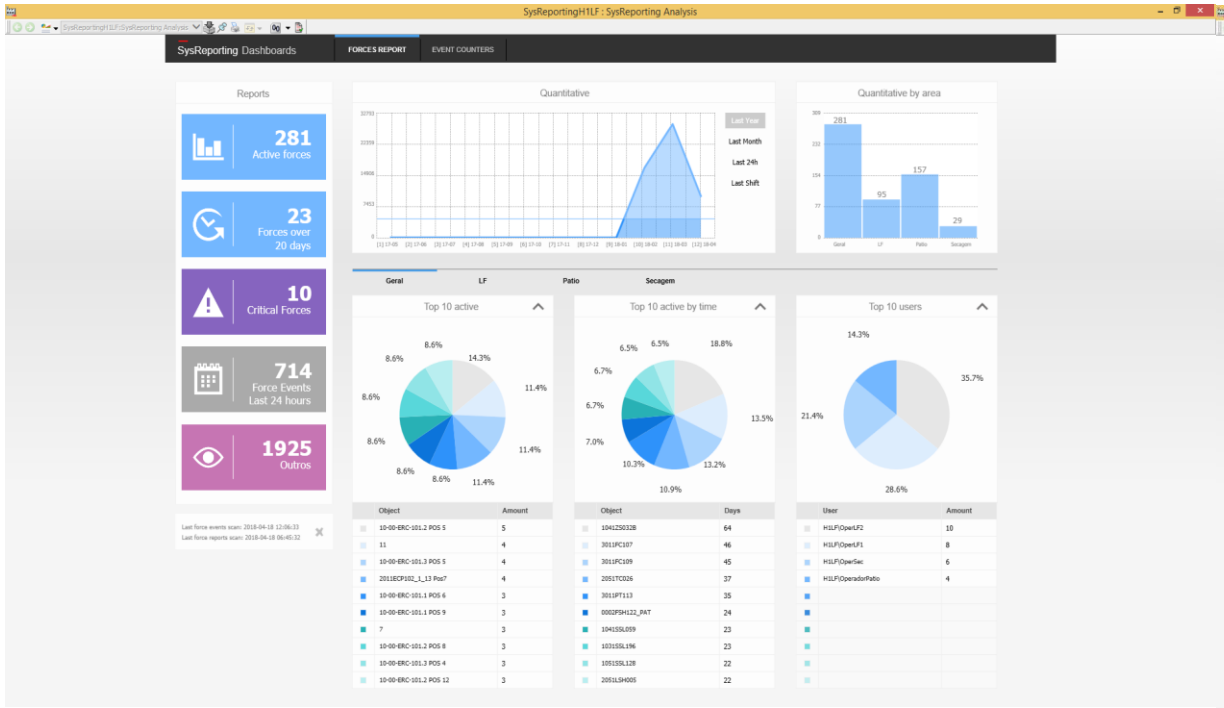
AssetVista connected to a Third-Part Control System

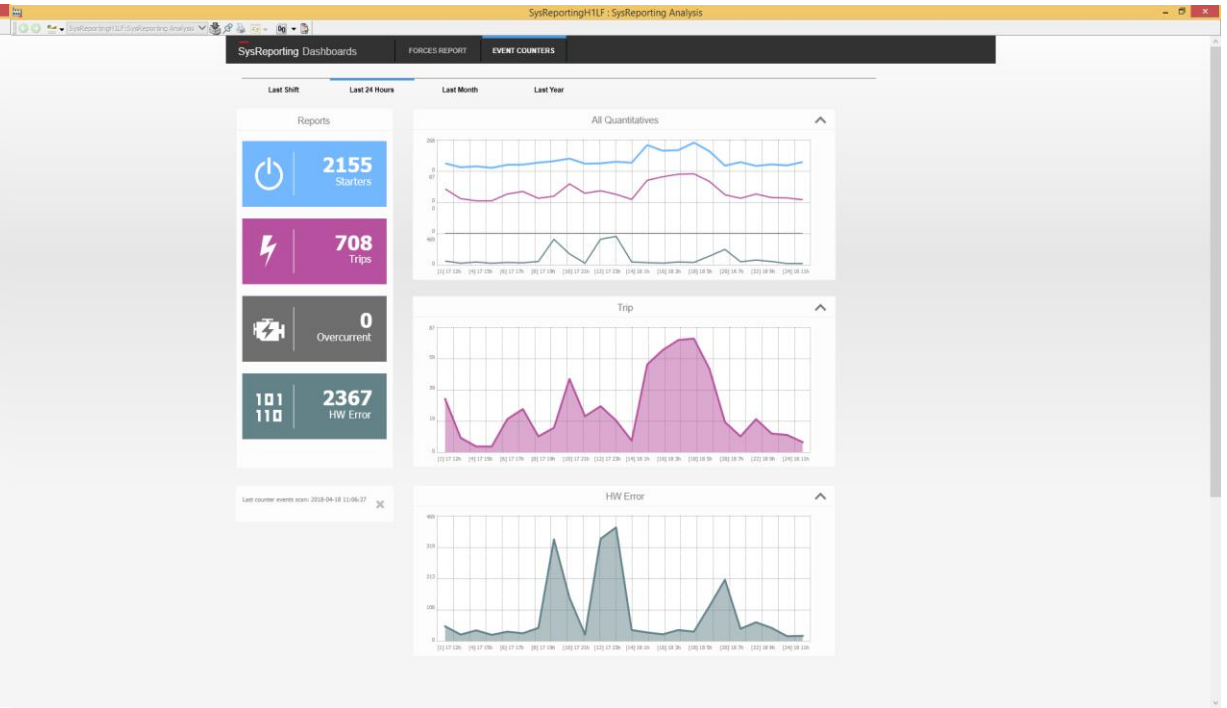


AssetVista connected to an 800xA System

ABB Ability AssetVista

SysReporting Add-in

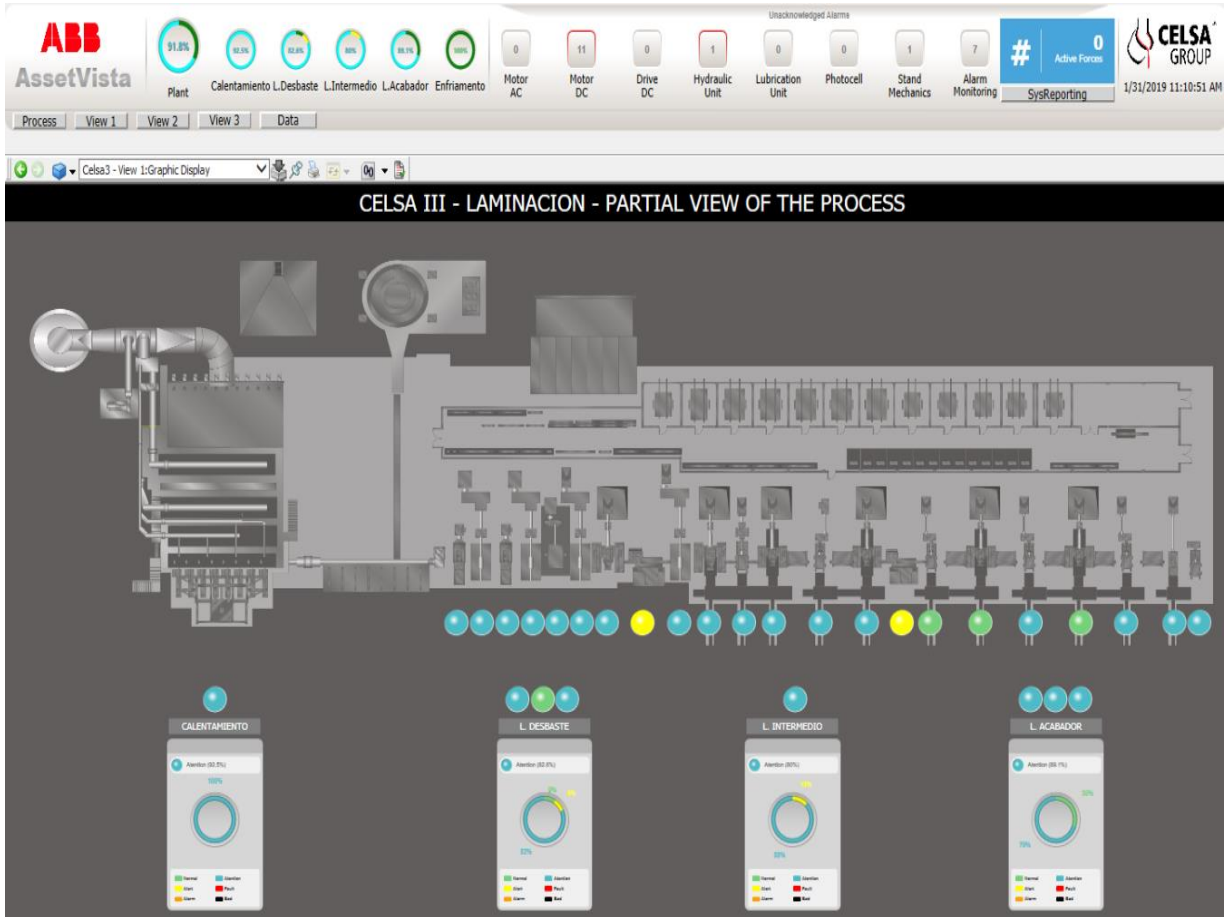




Customer Success Case

Metals Long Products: Celsa III Rolling Bar Mill

CELSA 3 Condition Monitoring:
Ability AssetVista for Rolling Bar Mill



Customer:

Celsa III Rolling Bar Mill

Initiative:

On premise digital solution to monitor Critical Mill assets like, 22 rolling mill stand Drives & Motors , 4 Hydraulics Units and 3 Lubrication Units and other predictive alarms signals from customer.

Customer needs:

Open and flexible asset management system able to monitor any asset of the plant.

Fast and Visible Digital solution for driving cultural change inside organization.

Benefits:

- Easy Identification of potential failures on main Mill assets.
- Real time condition monitoring.
- Proactive & predictive maintenance tool
- Increase uptime, Reduction of MTTR

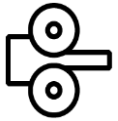
CELSA 3: Assets to be Monitored

REHEATING + ROUGHING AREA

REHEATING SECTION:

HYDR. UNIT : 3 x  AC Motor + 1 x  Hydr. monitor

ROUGHING SECTION:

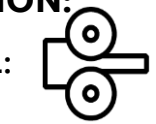
8 x STAND MILL:  +  DC Motor +  DC Drive

HYDR. UNIT : 4 x  AC Motor + 1 x  Hydr. monitor

LUB. UNIT : 3 x  AC Motor + 1 x  Lub. monitor

INTERMEDIATE + FINNISHING ROLLING AREA

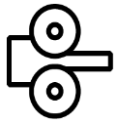
INTERMEDIATE SECTION:

7 x STAND MILL:  +  DC Motor +  DC Drive

HYDR. UNIT : 4 x  AC Motor + 1 x  Hydr. monitor

LUB. UNIT : 3 x  AC Motor + 1 x  Lub. monitor

FINNISHING SECTION:

7 x STAND MILL:  +  DC Motor +  DC Drive

HYDR. UNIT : 4 x  AC Motor + 1 x  Hydr. monitor

LUB. UNIT : 3 x  AC Motor + 1 x  Lub. monitor

More Assets to be implemented on next steps at COOLING and BUNDLING AREAS

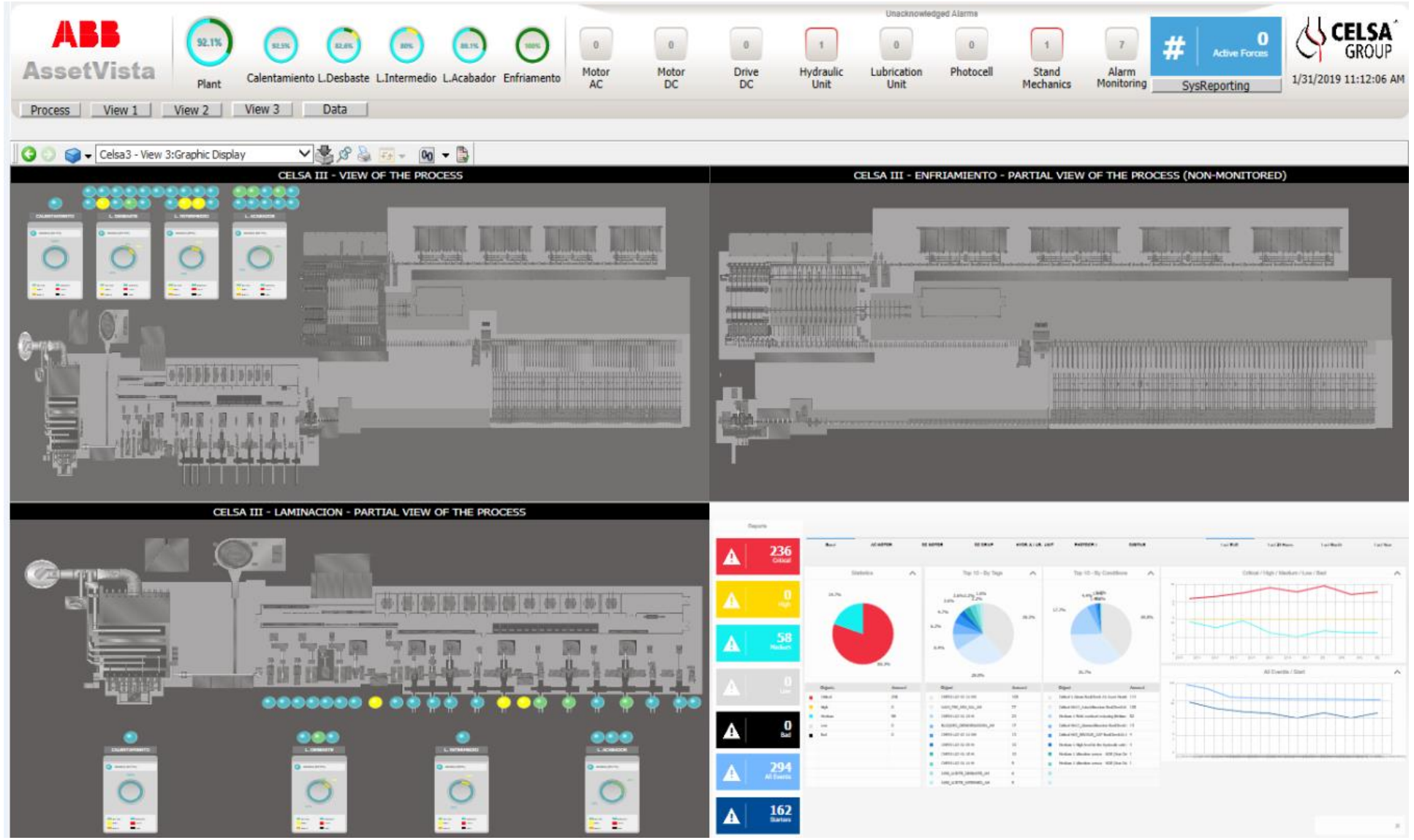


ABB
AssetVista
Plant
Calentamiento
L.Desbaste
L.Intermedio
L.Acabador
Enfriamiento
Unacknowledged Alarms
Motor AC
Motor DC
Drive DC
Hydraulic Unit
Lubrication Unit
Photocell
Stand Mechanics
Alarm Monitoring
Active Forces
SysReporting
CELSA GROUP
1/31/2019 11:12:06 AM
Process
View 1
View 2
View 3
Data
Celsa3 - View 3:Graphic Display
CELSA III - VIEW OF THE PROCESS
CELSA III - ENFRIAMIENTO - PARTIAL VIEW OF THE PROCESS (NON-MONITORED)
CELSA III - LAMINACION - PARTIAL VIEW OF THE PROCESS
236
0
58
0
294
162

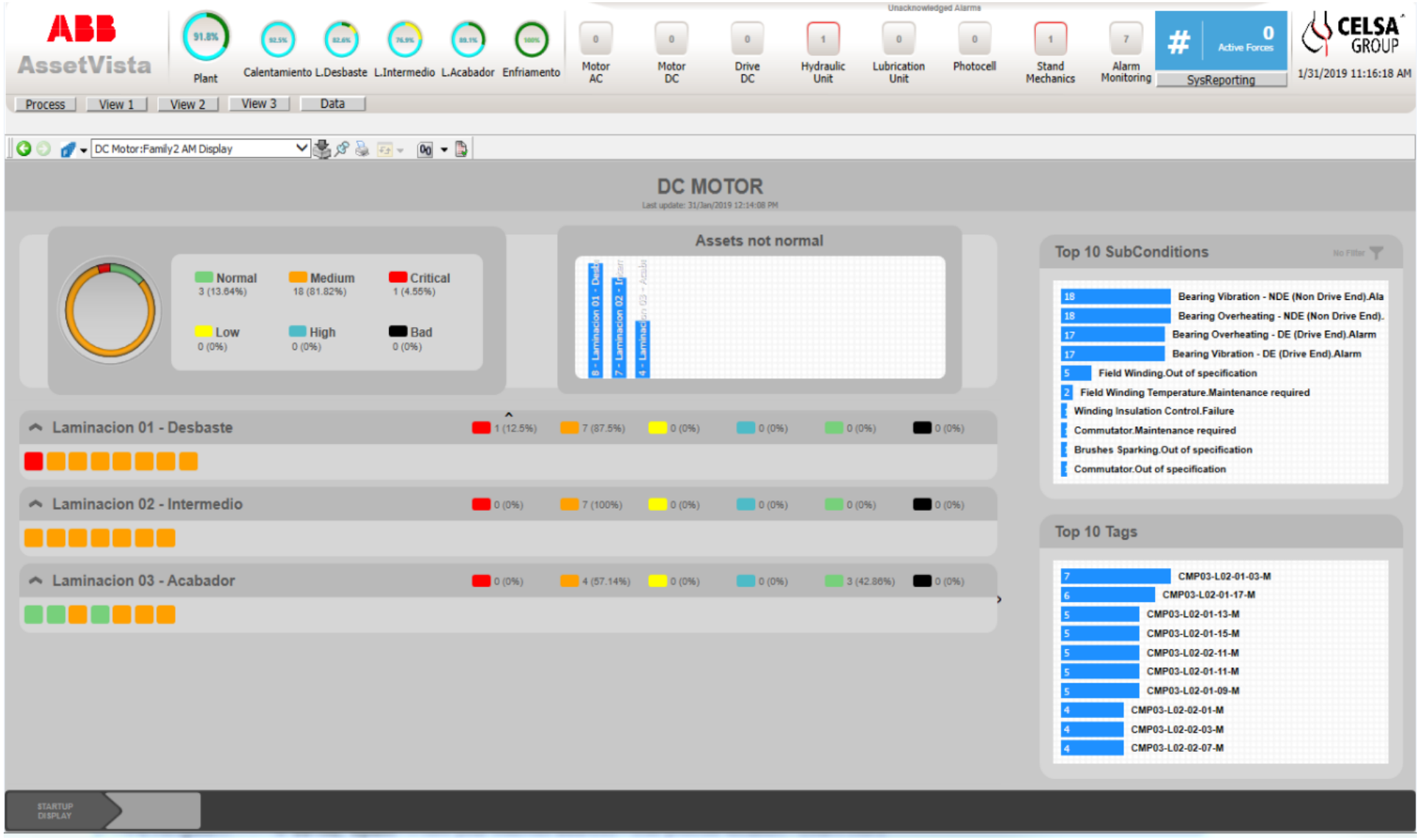
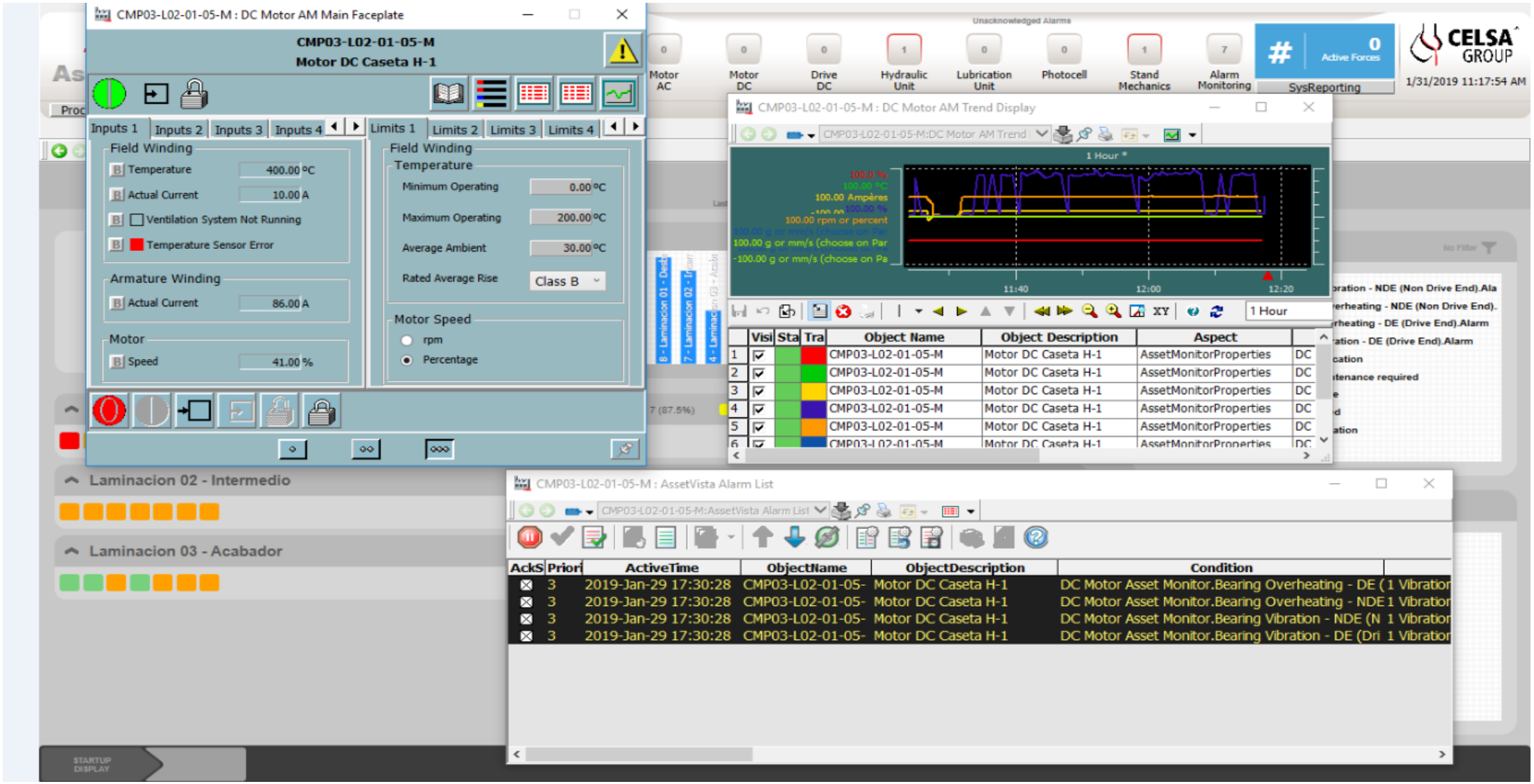


ABB AssetVista
Plant
Calentamiento
L.Desbaste
L.Intermedio
L.Acabador
Enfriamiento
Unacknowledged Alarms
Motor AC
Motor DC
Drive DC
Hydraulic Unit
Lubrication Unit
Photocell
Stand Mechanics
Alarm Monitoring
Active Forces
SysReporting
CELSA GROUP
1/31/2019 11:16:18 AM
Process
View 1
View 2
View 3
Data
DC Motor:Family2 AM Display
DC MOTOR
Last update: 31/Jan/2019 12:14:08 PM
Normal 3 (13.64%)
Medium 18 (81.82%)
Critical 1 (4.55%)
Low 0 (0%)
High 0 (0%)
Bad 0 (0%)
Assets not normal
Top 10 SubConditions
18 Bearing Vibration - NDE (Non Drive End).Ala
18 Bearing Overheating - NDE (Non Drive End).
17 Bearing Overheating - DE (Drive End).Alarm
17 Bearing Vibration - DE (Drive End).Alarm
5 Field Winding.Out of specification
2 Field Winding Temperature.Maintenance required
Winding Insulation Control.Failure
Commutator.Maintenance required
Brushes Sparking.Out of specification
Commutator.Out of specification
Laminacion 01 - Desbaste
1 (12.5%) 7 (87.5%) 0 (0%) 0 (0%) 0 (0%) 0 (0%)
Laminacion 02 - Intermedio
0 (0%) 7 (100%) 0 (0%) 0 (0%) 0 (0%) 0 (0%)
Laminacion 03 - Acabador
0 (0%) 4 (57.14%) 0 (0%) 0 (0%) 3 (42.86%) 0 (0%)
Top 10 Tags
7 CMP03-L02-01-03-M
6 CMP03-L02-01-17-M
5 CMP03-L02-01-13-M
5 CMP03-L02-01-15-M
5 CMP03-L02-02-11-M
5 CMP03-L02-01-11-M
5 CMP03-L02-01-09-M
4 CMP03-L02-02-01-M
4 CMP03-L02-02-03-M
4 CMP03-L02-02-07-M
STARTUP DISPLAY


CMP03-L02-01-05-M : DC Motor AM Main Faceplate
CMP03-L02-01-05-M
Motor DC Caseta H-1
Inputs 1
Inputs 2
Inputs 3
Inputs 4
Limits 1
Limits 2
Limits 3
Limits 4
Field Winding
Temperature 400.00 °C
Actual Current 10.00 A
Ventilation System Not Running
Temperature Sensor Error
Armature Winding
Actual Current 86.00 A
Motor
Speed 41.00 %
Field Winding
Temperature
Minimum Operating 0.00 °C
Maximum Operating 200.00 °C
Average Ambient 30.00 °C
Rated Average Rise Class B
Motor Speed
rpm
Percentage
Unacknowledged Alarms
Motor AC
Motor DC
Drive DC
Hydraulic Unit
Lubrication Unit
Photocell
Stand Mechanics
Alarm Monitoring
Active Forces
SysReporting
CELSA GROUP
1/31/2019 11:17:54 AM
CMP03-L02-01-05-M : DC Motor AM Trend Display
1 Hour
100.00 Ampères
100.00 rpm or percent
11:40
12:00
12:20
Visi
Sta
Tra
Object Name
Object Description
Aspect
CMP03-L02-01-05-M
Motor DC Caseta H-1
AssetMonitorProperties
Laminacion 02 - Intermedio
Laminacion 03 - Acabador
CMP03-L02-01-05-M : AssetVista Alarm List
AckS
Priori
ActiveTime
ObjectName
ObjectDescription
Condition
3
2019-Jan-29 17:30:28
CMP03-L02-01-05-
Motor DC Caseta H-1
DC Motor Asset Monitor.Bearing Overheating - DE (1 Vibration
DC Motor Asset Monitor.Bearing Overheating - NDE 1 Vibration
DC Motor Asset Monitor.Bearing Vibration - NDE (N 1 Vibration
DC Motor Asset Monitor.Bearing Vibration - DE (Dri 1 Vibration
STARTUP DISPLAY

DC Motor Conditions Monitored by AssetVista

MECHANICAL CONDITIONS

MOTOR BEARINGS STATUS:

- Vibrations
- Temperatures
- Diff. Temperature
- Sensors error

GREASING STATUS:

- Grease Type
- Greasing cycle

ELECTRICAL CONDITIONS

MOTOR INSULATION STATUS:

- Winding insulation Test and trend calculation

CONMUTATOR STATUS:

- Diagnostic based on Visual inpection

OVERLOAD STATUS:

- Motor Temperature
- Motor Armature Current
- Motor Field Current

OTHER CONDITIONS

ENCODER STATUS:

- Encoder error
- Time to replace

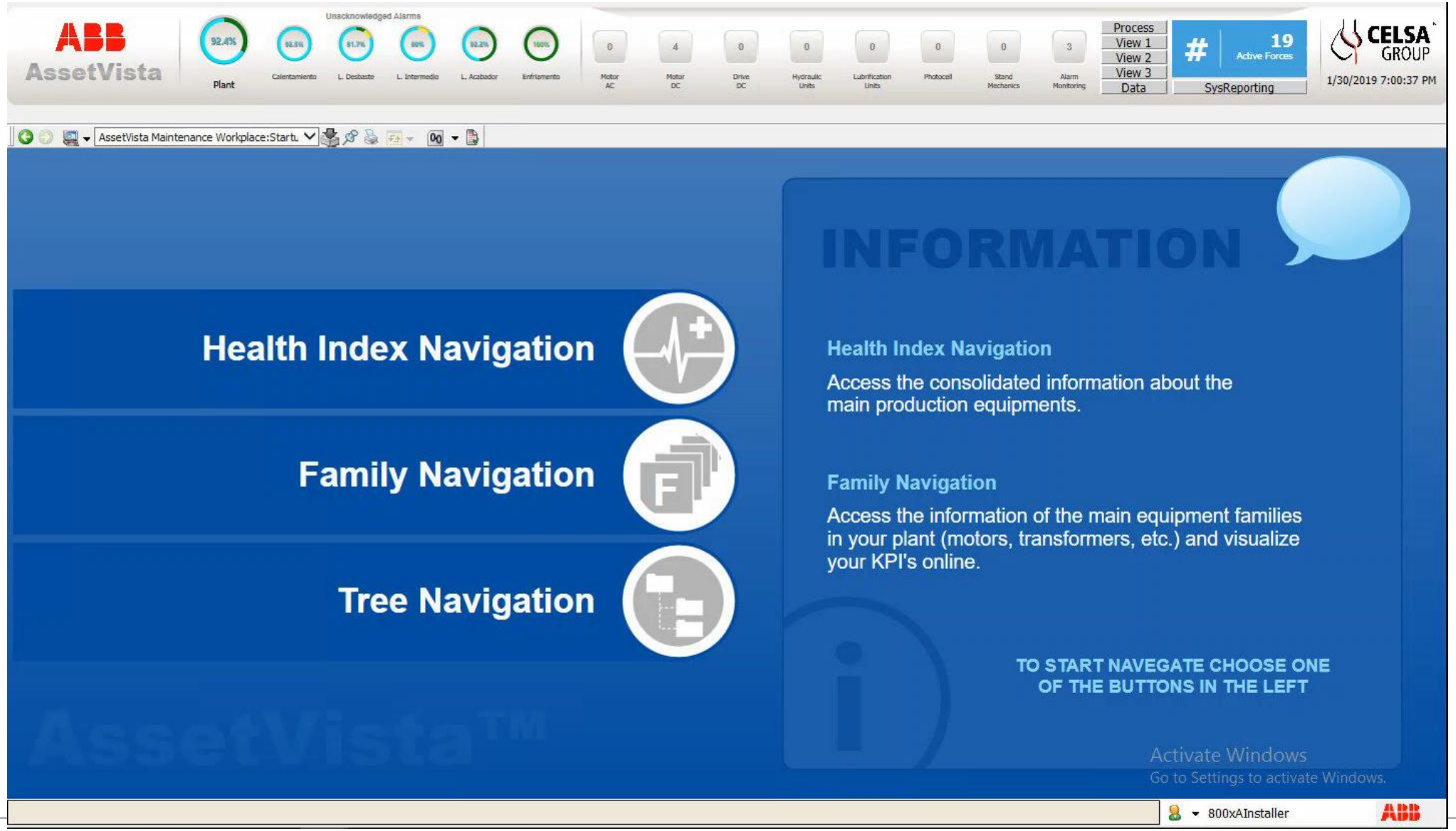
CARBON BRUSHES STATUS:

- Time to replace: visual inspection and current calc.

FORCED VENTILATION STATUS:

- Fan status
- Motor Overload

Other Conditions to monitored could be added if needed


AssetVista
Unacknowledged Alarms
Plant
Calentamiento
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L. Intermedio
L. Acabador
Enfriamiento
Motor AC
Motor DC
Drive DC
Hydraulic Units
Lubrification Units
Photocell
Stand Mechanics
Alarm Monitoring
Process
View 1
View 2
View 3
Data
19
Active Forces
SysReporting
CELSA GROUP
1/30/2019 7:00:37 PM
AssetVista Maintenance Workplace:Start
Health Index Navigation
Family Navigation
Tree Navigation
INFORMATION
Health Index Navigation
Access the consolidated information about the main production equipments.
Family Navigation
Access the information of the main equipment families in your plant (motors, transformers, etc.) and visualize your KPI's online.
TO START NAVEGATE CHOOSE ONE OF THE BUTTONS IN THE LEFT
AssetVista™
Activate Windows
Go to Settings to activate Windows.
800xAInstaller
ABB

Ability AssetVista

Industrial Automation – writing the future of safe and smart operations

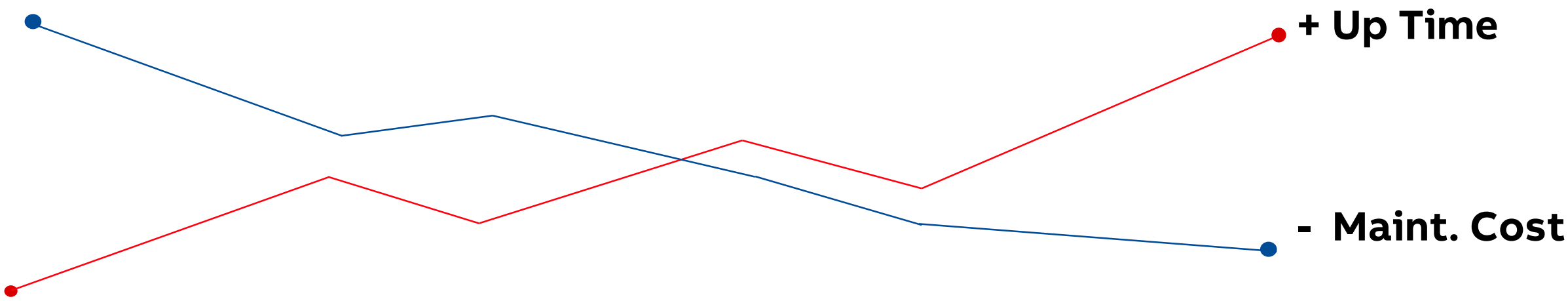

ABB Ability ™ is how we harness the power of digital to drive progress with our customers every day.

Know more
Utilize your industrial data through sensors, devices and software to know more about your business in real-time.

Do more
Monitor, control and manage your devices, processes and operations on-site or remotely.

Do better
Simulate, predict and optimize through tools, insights and analysis.

Together
Work hand-in-hand with our experts and engineers anywhere around the globe for business transformation.


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