

ANDRITZ CAPITAL MARKET DAY 2021

AUTOMATION

WOLFGANG SEMPER

SEPTEMBER 15, 2021

ANDRITZ

ENGINEERED SUCCESS

ANDRITZ AUTOMATION GLOBAL PRESENCE AND COMPETENCES

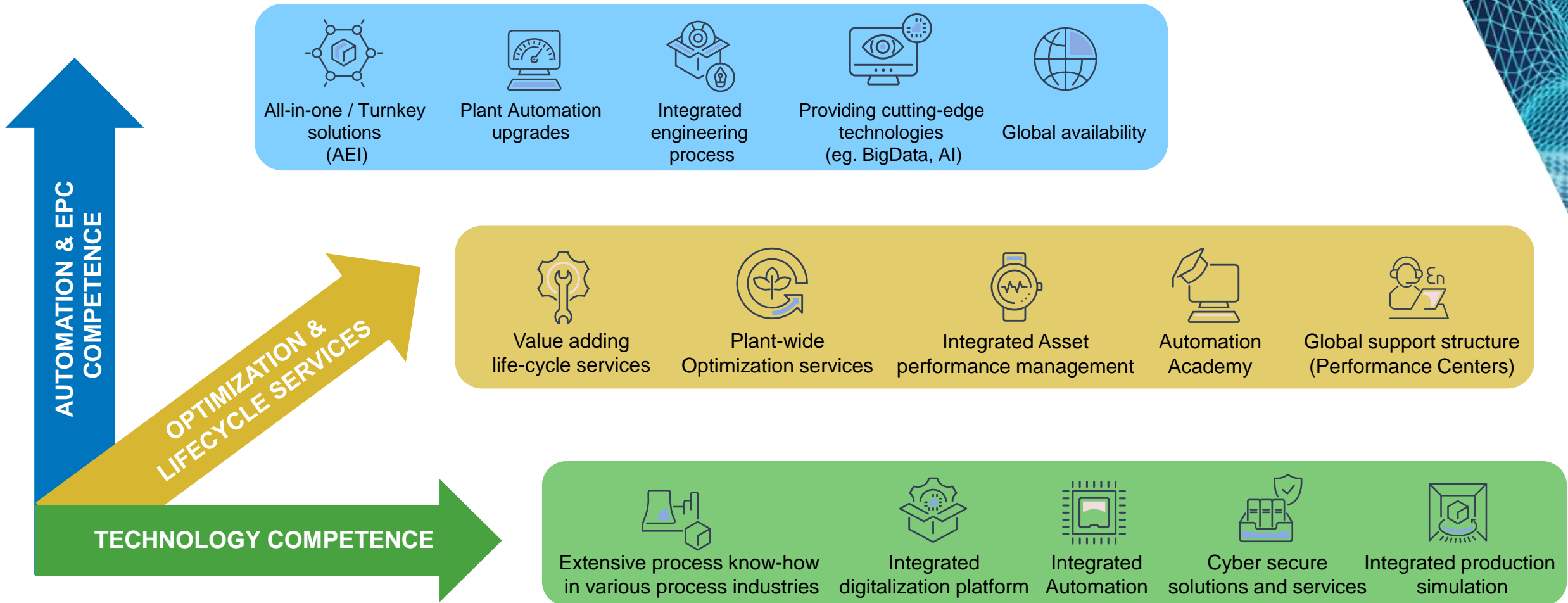
- **110 Automation locations**
(ANDRITZ GROUP: > 280 locations)
- **1,800 Automation employees**
(ANDRITZ GROUP: > 26,700 employees)
- **Complete Automation and Digitalization solutions for**
 - HYDRO
 - PULP & PAPER
 - METALS
 - SEPARATION
 - OTHER PROCESS INDUSTRIES
- **REVENUE > 650 MEUR** (included in business area figures)



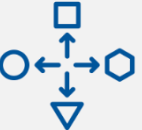
ANDRITZ AUTOMATION

WHAT MAKES US DIFFERENT

35+ years Automation/Digitalization competence out of one hand



GLOBAL COMPETITION AND ENVIRONMENTAL CHALLENGES FORCES INDUSTRIES TO ACT




Heterogenous DCS landscapes
Increasing complexity for mature plants



Customers know-how protection
Cyber-security / IP right protection



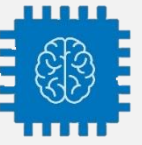
Sustainable & environmental friendly production
Raw material reduction / optimize use of resources



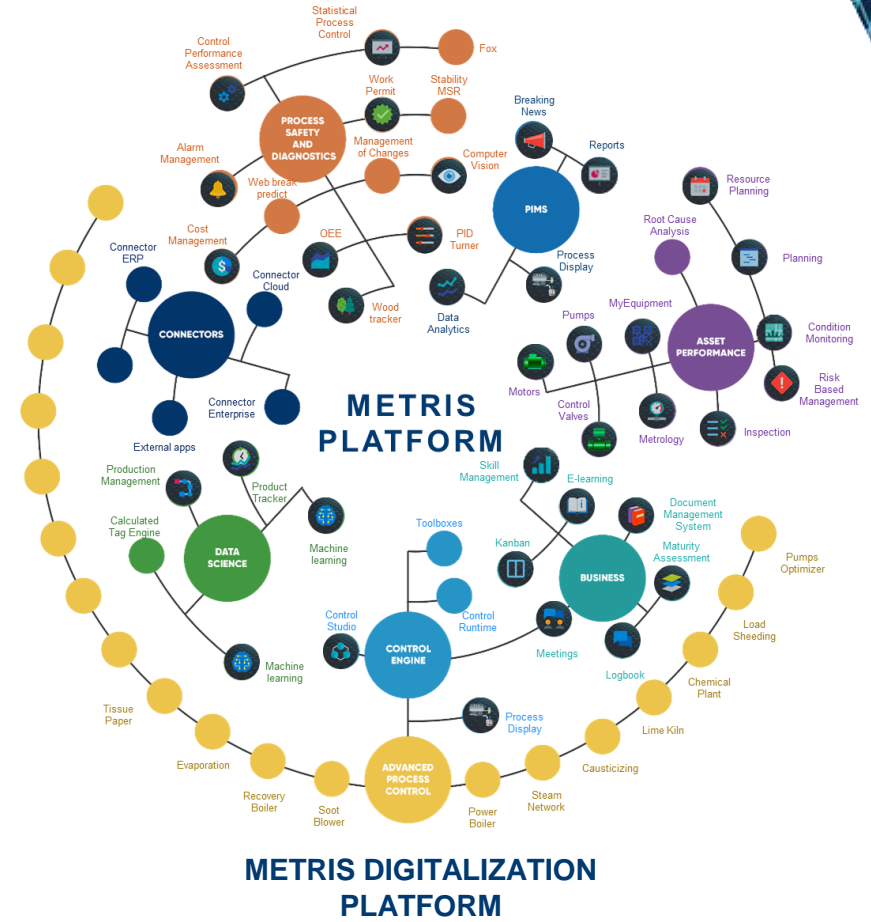
Fully automated production
Too much manual interventions required



High demand for production flexibility
Intelligent & plant-wide production strategies



Automation & AI competencies
Joint expert approach with data scientists and Automation



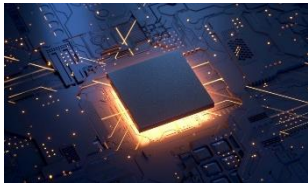
METRIS – ANDRITZ DIGITAL SOLUTIONS FOR PROCESS INDUSTRIES AND ENERGY UTILITIES

One platform fits for all

Industry independent portfolio



Metris Digitalization platform



ANDRITZ DCS – Metris X



Asset performance & Maintenance management



Process optimization



Simulation & Digital twin



Remote operation & 24/7 support hotline



Cyber security products & solutions

Selection of Industry specific solutions



Pulp & Paper



Hydro



Metals



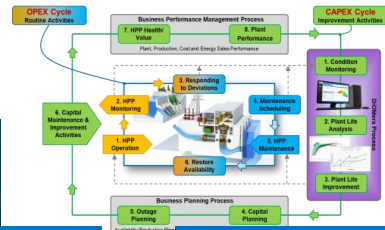
Separation



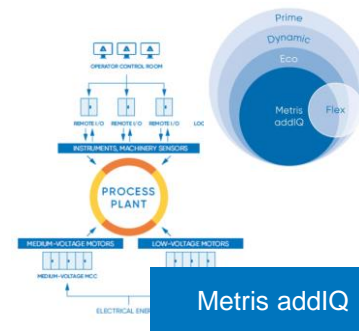
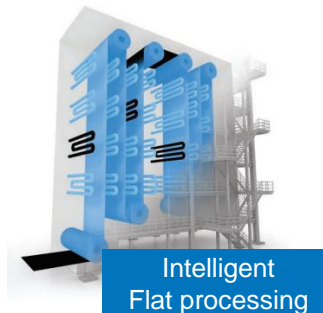
Other process industries



Metris solutions for Pulp & Paper



Metris DiOMera



METRIS UX – THE ALL-IN-ONE PLATFORM

01 CLASSIC AUTOMATION



- Distributed control system (DCS)
- Motors & drives (MMD)
- Automation, Electrification, Instrumentation (AEI)

02 ADVANCED AUTOMATION

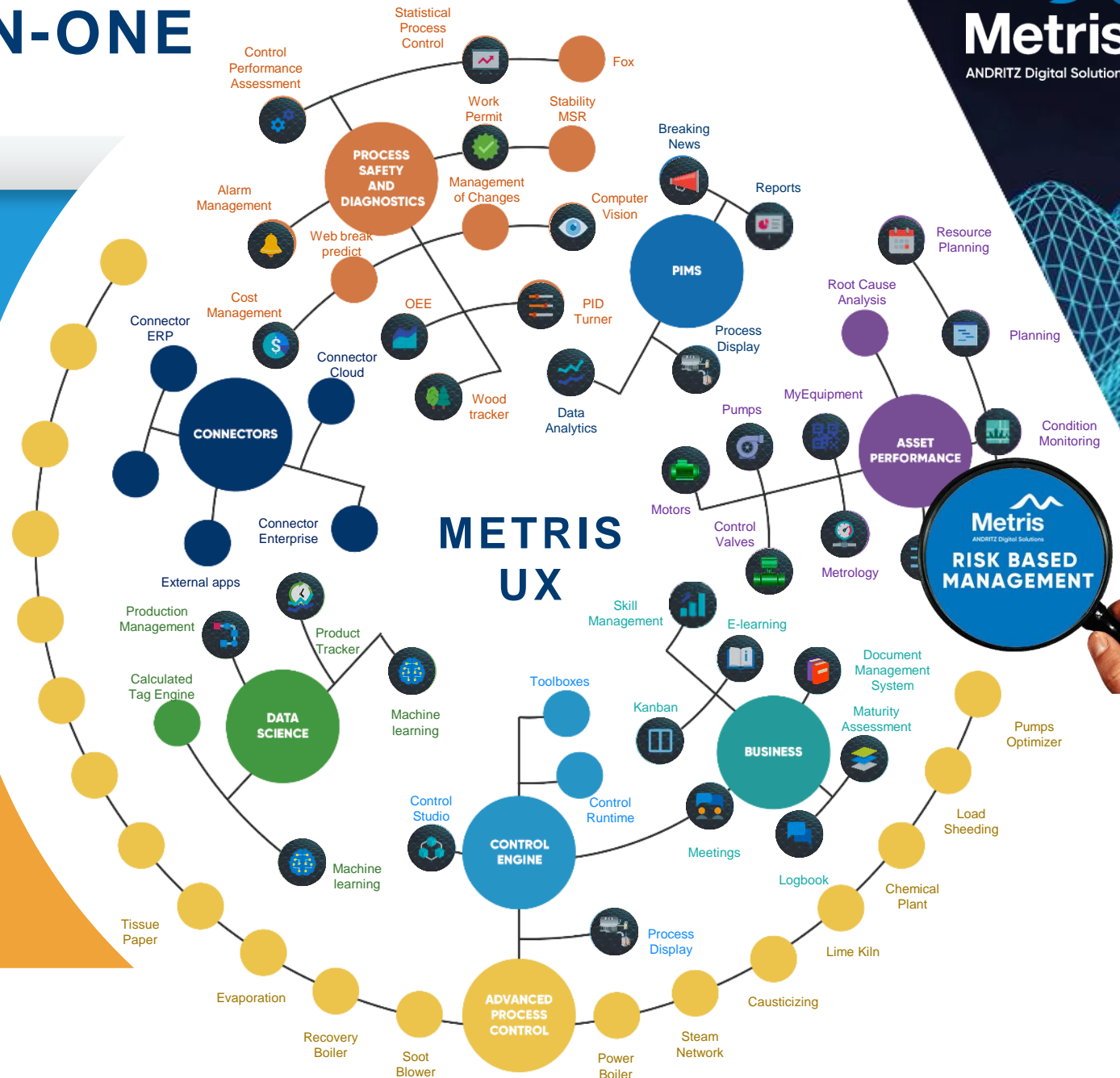


- Asset Performance & Maintenance management
- Process analytics & Production information
- Process optimization
- Production management

03 ADVANCED PERFORMANCE SERVICES



- Production optimization (OPP)
- Performance Center & 24/7 Hotline
- Simulation & Digital Twin
- Cyber security & Managed services
- Smart services
- Mixed Customer service bundles (SYNERGY)

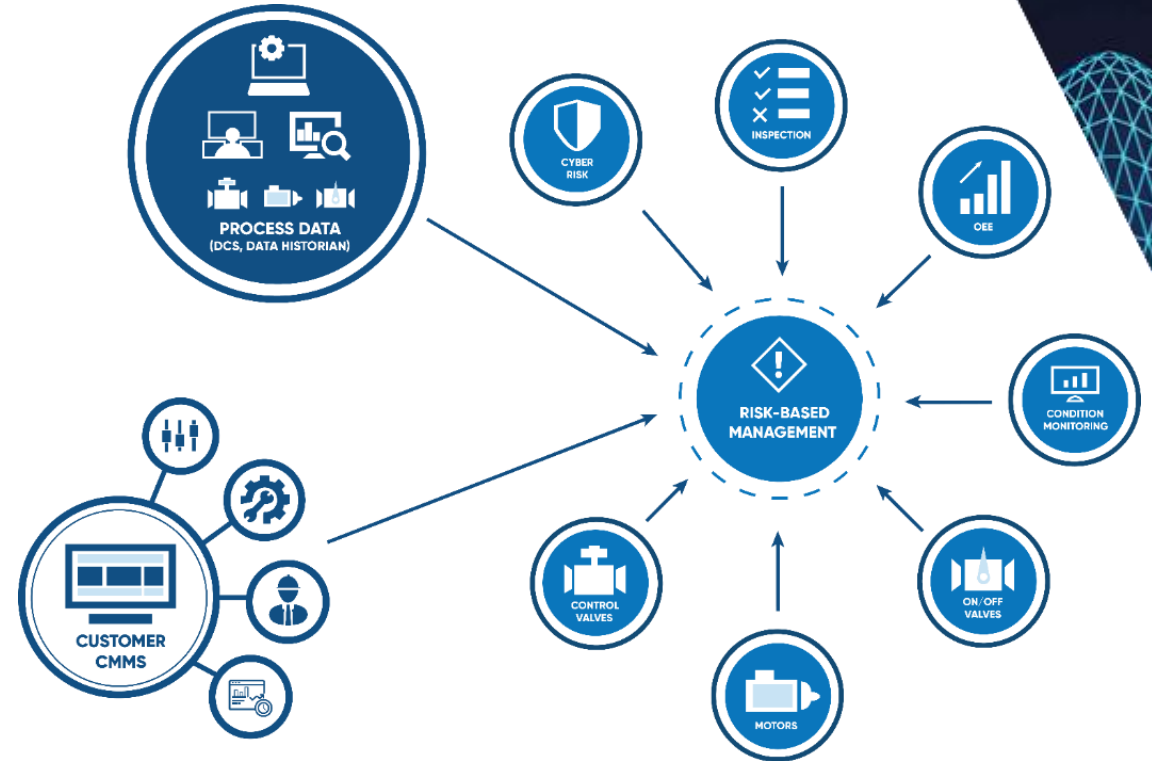


METRIS ALL-IN-ONE PLATFORM

Hosts all data from all assets on a plant-wide scale

Metris Risk Based Management (RBM)

- **All-in-one database** hosts all asset information and process data
- Anomaly detection uses **complete database** to identify either clear asset problems or process related risks, or even a combination of both
- **Combined plant-wide analytics** of potential overall production risk calculating all risk vectors displayed in one App
 - ✓ Condition monitoring for critical assets (motors, valves, pumps, e.t.c.)
 - ✓ Calculation of individual production risks (single source, redundant equipment, e.t.c.)
 - ✓ Embedding maintenance risks (maintenance routes, inspections, e.t.c.)
 - ✓ Including cyber security risks (vulnerabilities, remote access, e.t.c.)

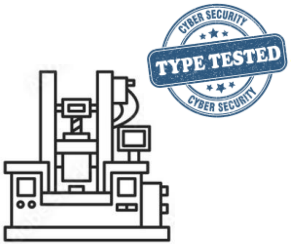


CYBER SECURITY BY DESIGN

CYBER SECURITY PORTFOLIO – Customer Journey

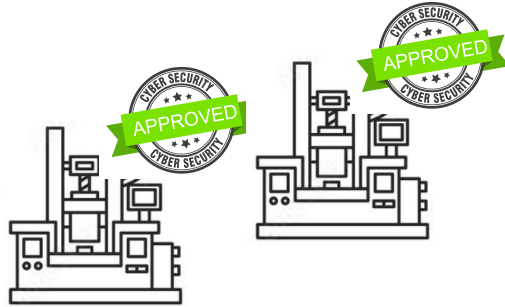
ANDRITZ

Cyber security by „expert design“



Type test - once per process island / machine type

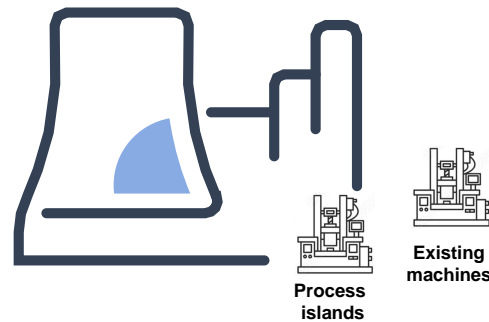
spOT™ cyber security SCAN @ FAT



Automated CHECK for all ANDRITZ deliveries

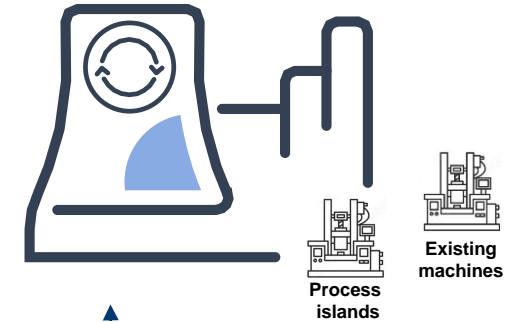
Customers production sites

ANDRITZ Aftersales service based on spOT™



Periodic cyber security CHECK as a Service

RAM² Plant wide – 24/7 cyber security orchestration platform



Continuous cyber security for a heterogeneous plant

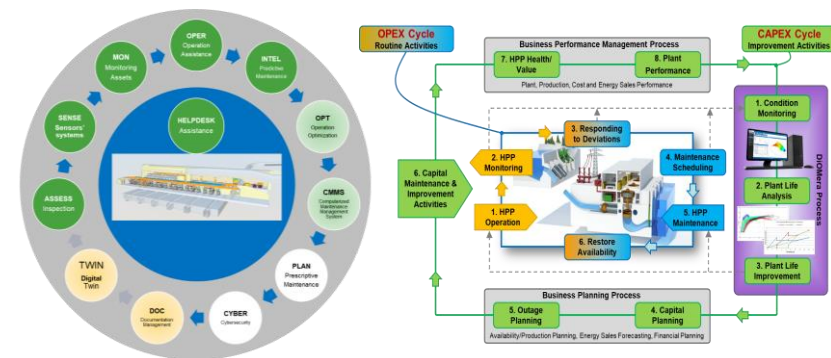
remOT™ Secure remote connectivity management system

ANDRITZ AUTOMATION PRODUCT PORTFOLIO FOR ENERGY UTILITIES

250 SCALA – Complete control room applications



Metris DiOMera – Asset management



HIPASE – Automation - One platform – four different functions

Protection



- Initiate shut down in case of electrical fault
- No active function during operation

Excitation



- Generator Voltage Regulator (AVR)
- Control function (Start/Stop excitation, trip)

Turbine Governor



- Speed regulation
- Load regulation
- For all types of turbines

Synchronization



- Paralleling of unit – grid
- Circuit breaker controls

Cyber security solutions



INDUSTRY SOLUTION FINDER METRIS MARKET PLACE

... implementation underway...

The screenshot displays the Metris UX Solution Finder interface. The top navigation bar includes the Metris logo, the title "Metris UX", and standard browser window controls. Below the navigation bar, the "Solution Finder" section shows "Showing 210 Solutions" and a "Clear Filter" button. A search bar is located to the right of the filter button. The main content area is organized into a grid of solution cards, each representing a different application. The cards are grouped under "Operations Performance Management" and "Control System".

Operations Performance Management

- ALARM MANAGEMENT**: Metris Alarm Management assess alarm data-set from digital control systems supporting users daily analysis of work rationalization in order to achieve
- BUSINESS ANALYTICS**: User can combine data from different Apps to create their own visualization and analytics.
- COIL MONITORING**: Product quality root-cause analyses. Increase product quality by adjusting production parameters accordingly.
- CONTROL PERFORMANCE ASSESSMENT**: Discovers unknown and hidden process upsets, prioritize saving opportunities and support users to achieve more practical and cheapest decision-
- COST MANAGEMENT**: Get the precise decision you need. Metris Cost Management interpretes process data into behaviors to clearly point out where are the
- CUSTOMER SUPPORT MANAGEMENT**: Support to customer, complains management, management of quality issues for customers of our customers, etc.
- ENERGY MANAGEMENT**: Monitor, forecast and optimize the energy consumption of plants.
- INCIDENT RESPONSE**: Monitoring of critical variable and trigger action plans to quick solve issues.
- LOAD SHEEDING**: Reacts to unplanned events to protect the electrical power system from a total blackout.
- MANUFACTURING EXECUTION SYSTEM**: Production Plan, Maintenance Backlog, etc.
- OEE**: Metris OEE goes far beyond effectiveness equations. By tracking and processing data inputs, control, costs and environmental aspects, a
- POWER SYSTEM**: Monitoring, simulation and management of the electrical power system.
- PRODUCTION MANAGEMENT**: Production Management is a Metris Application, which deals with mill balances of all kind. Balances of mass, energy, steam, chemicals... can be either
- QUALITY MANAGEMENT**: Daily reports, quality losses, track & trace production units, like bales, rolls, coils, etc.
- RECIPE MANAGEMENT**: Manage recipes, grades and batch changes.
- REZOLVE**: Optimizing the Press Section with complementary Roll Cover and Press Felt design
- SEQUENCE OF EVENTS (SOE)**: Collections of events in order to make a Sequence of Events. Precision is 1ms.
- SHIFT MANAGEMENT**: Management of the shift, including logs, new maintenance required, production losses entry, handover to next shift, report of last shift, compare
- STATISTICAL PROCESS CONTROL**: Assessing every process overtime. Metris Statistical Process Control delivers methodologies to support eliminating meaningless source of variations and
- STRATEGY MANAGEMENT**: It can be used for Policy Deployment, Balanced Scorecard, SMART goals, SWOT analysis, roles and responsibilities, delegation matrix, etc.
- WAREHOUSE MANAGEMENT**: Support and optimize the management of warehouse.
- WOOD TRACKER**: Tracking of wood logs to chips combining wood characteristics with process variables related.
- WORK PERMIT**: Work Permit application is a digital solution to prevent, control and previously authorize the worker to perform a specific activities with

Control System

- APPLICATION**

Group

- Digital Solutions
 - Advanced Data Analytics
 - Advanced Process Controls
 - Asset Performance Management
 - Autonomous Operations
 - Control System
 - Cybersecurity
 - Digital Twins
 - IoT Platform
 - Operations Performance Management
 - PIMS
 - Productivity
 - Simulation
 - Smart Sequences
 - Sustainability
- Classic Automation
 - Automation
 - Electrification
 - Engineering
 - Instrumentation
- Performance Services

Industries

- All solutions Generic Specific
- Biofuel
- Cement
- Chemicals
- Energy
- Feed
- Food and Beverages
- Metals
- Mining and Minerals

METRIS DIGITAL SOLUTIONS – OPTIMIZATION OF PROCESS PERFORMANCE

Suzano Group (Brazil) - 11 million tons of pulp capacity being optimized by ANDRITZ

- Optimization contracts in various plants with references since 2007 and still there at Aracruz (3 lines), Três Lagoas (2 lines), Suzano, Jacareí, Mucuri (2 lines), Imperatriz and Veracel (1 line - 50% owned by Suzano)
- Mix of ANDRITZ and competitors' equipment
- Several Metris solutions provided to Suzano:
 - Metris OPP (Optimization of Plant Performance) agreements
 - Advanced Process Controls
 - Artificial Intelligence
 - Asset Performance Management
 - Digital Twins
 - Process Simulation

> **EUR 200 million benefits** provided to customer in production increase, minimizing chemical and fuel consumption, maximizing energy production and improving environmental parameters



METRIS DIOMERA FOR ENEL PROJECT: PRESHAGO

Predictive System and Analytics for Global Hydro Operation

- **Elaborating a predictive maintenance model** to tackle potential faults in hydroelectric power plants
- Move from “preventive” to “predictive” maintenance strategies
- **Detect significant changes of pace** thanks to its data-based management strategy
- **Schedule maintenance works before potential faults arise** → process optimization

5 Countries (Argentina, Brazil, Chile, Peru, Colombia)

44 Plants

3 Year continuous plant optimization & advanced predictive services

9,850 MW equipped with Metris-DiOMera



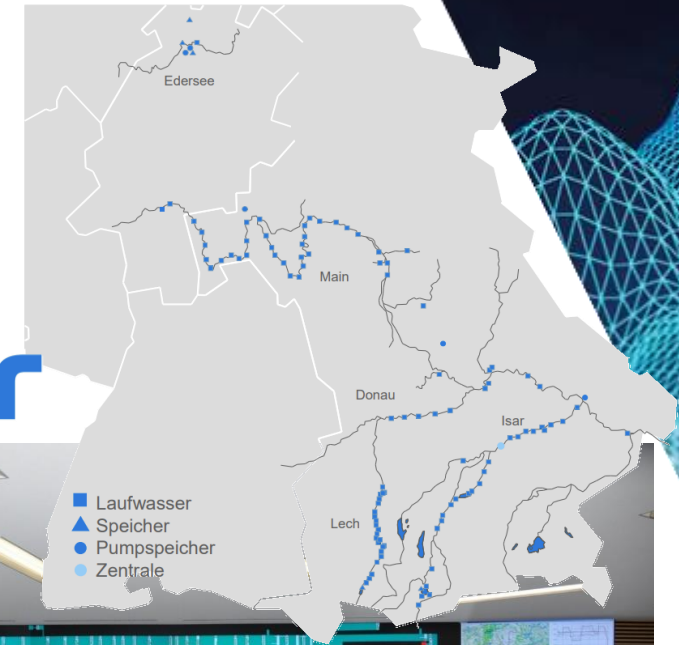
CENTRAL CONTROL ROOM FOR UNIPER WASSERKRAFT, LANDSHUT

250 SCALA as large Central Control System

- 250 SCALA, our innovative **high-performance SCADA system**
- Multi hierarchic system
- Backup systems for emergency situations
- Excellent scalability from
 - small local unit control, power plant control up to central control systems
- Client benefits
 - One system for all control levels
 - Less engineering costs
 - Future-proof due to SW compatibility

Super vision and control of more than
125 hydroelectric power plants in one system

**uni
per**



ROADMAP 2022-2024

Further strengthen ANDRITZ's position as digital solution provider

- ANDRITZ Automation **well positioned in ancestral industries** (Pulp & Paper, Hydro, Metals, Separation)
- **Metris digitalization platform** is the solid foundation to support **future growth** of all ANDRITZ business areas
- **Market launch of „holistic asset performance management“ (Metris RBM) including cyber security**



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MANY THANKS!

SEPTEMBER 15, 2021

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