OCTOBER 25, 2023

An Equipment Health Journey

Connecting AVEVA™ PI System™ with AVEVA™ Predictive Analytics

Allen Turner

AVEVA

International Paper

Who We Are

- Founded in 1898
- 39,000 employees worldwide
- 250 facilities (35 U.S. states & 10 countries)
- 21,000 customers in 150 countries
- $21.2 billion net sales in 2022

Recognition

Core Values

It's about... **LIFE** — LIFE-CHANGING INJURY AND FATALITY ELIMINATION

COURAGE · TO CARE ·

AV=VA

International Paper

Our Businesses

Industrial Packaging

Global Cellulose Fibers

Source: International Paper – Corporate Communications

AVEVA

Pulp & Paper – Continuous Industrial Manufacturing

Typical Pulp Mill

- 4 main unit operations
- ~30,000 total equipment assets
  - ~5% designated critical
  - ~1% high priority critical assets
- ~1,500 control loops
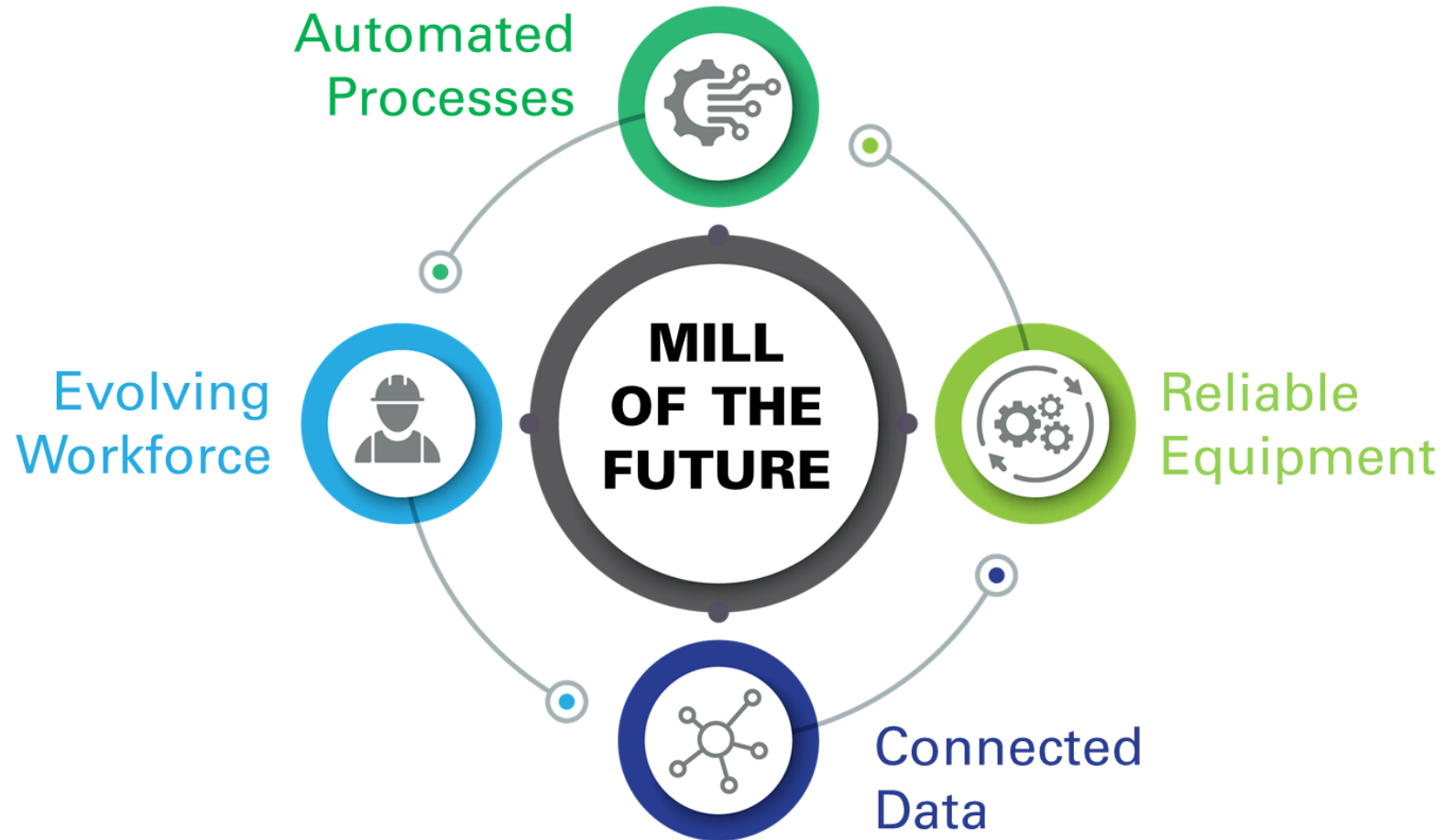- ~30,000 to 100,000 process data tags

International Paper – by the numbers

- Facilities: 29
- PI Servers: 46
- PI Tags: 1.5 Million
- Equipment: 120,000 Rotating Equipment

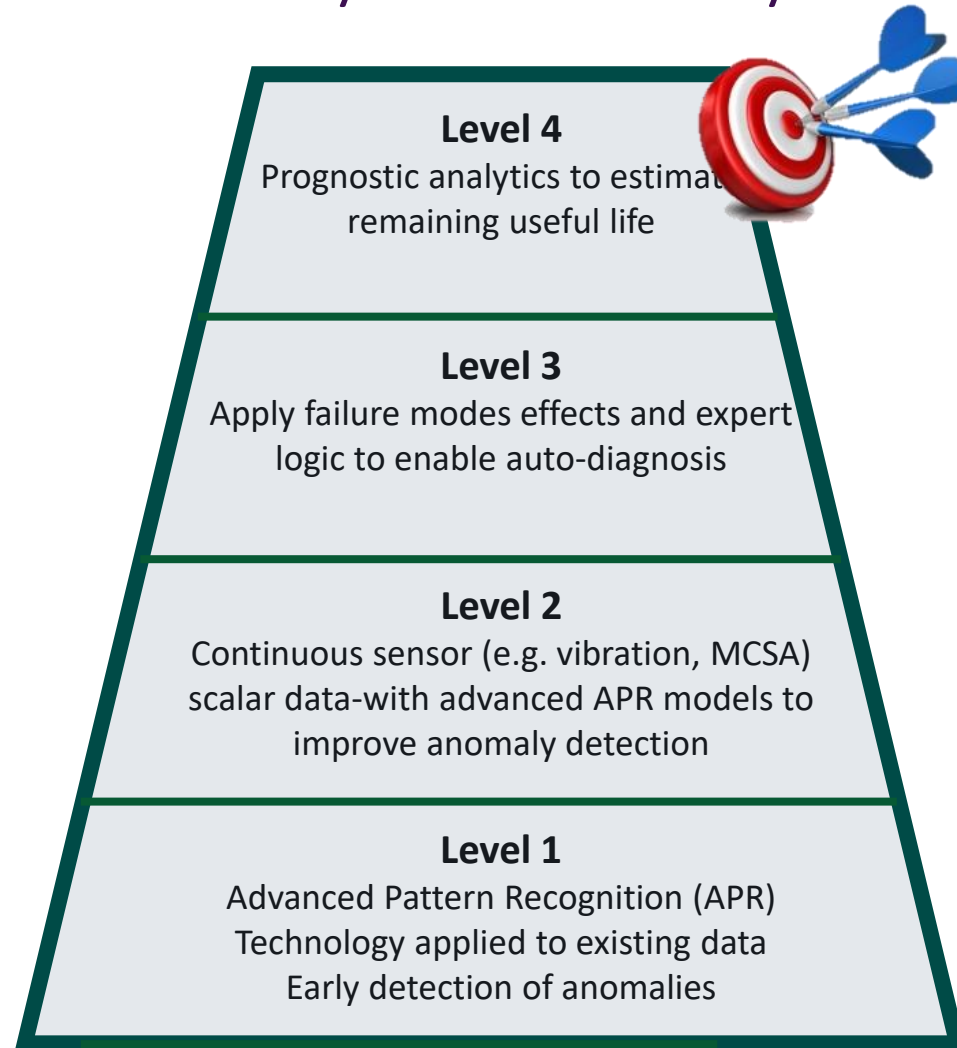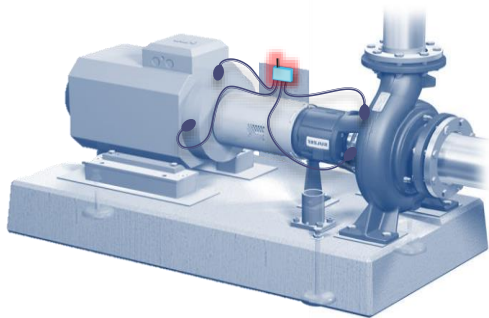Source: International Paper – Corporate Communications

AVEVA

What is a Mill of the Future?

Automated Processes

Evolving Workforce

MILL OF THE FUTURE

Reliable Equipment

Connected Data

AVEVA

Our Equipment Health Analytics Journey

Full vision is reach Level 4 COLM of Critical rotating equipment to reach maximum value of expected equipment life

Level 4
Prognostic analytics to estimate remaining useful life

Level 3
Apply failure modes effects and expert logic to enable auto-diagnosis

Level 2
Continuous sensor (e.g. vibration, MCSA) scalar data-with advanced APR models to improve anomaly detection

Level 1
Advanced Pattern Recognition (APR) Technology applied to existing data Early detection of anomalies

AVEVA

Pulp & Paper - Reliability Opportunity

Reliability events over four (4) years

Annual potential **continuous on-line monitoring finds** for the enterprise

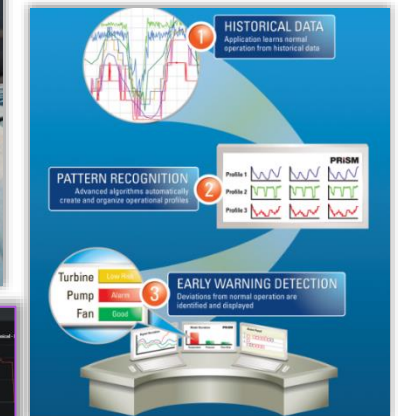Future projects will go after other failure modes until all failures are eliminated.

AVΞVA

Equipment Health - Continuous On-line Monitoring

Reliable Equipment

An investment in disruptive technology including advanced sensors and data analytics for critical rotating equipment to eliminate unplanned failures and extend equipment life.

- Advanced sensors, both wired and wireless sensors for critical rotating equipment

- Advanced pattern recognition (APR) for continuous monitoring and diagnostics – predicting failures and providing early warning of equipment issues days, weeks, or months prior to pending failure

- AVEVA PI System, AVEVA PI Server Asset Framework, and AVEVA Predictive Analytics are foundational tools for this project.

Advanced Analytics Center

Source: International Paper – Corporate Communications

Centralized Analytics Team – A2C

Advanced Analytics Center (A2C) :   An investment in a centralized cross-functional team that is strategically focused on value generation from manufacturing data

- Concept initiated March 2018

- Located in Atlanta's Technology Square

- A "flashlight" into our mill processes

- Early warning of drifts

- Continuous audit process

- Operational data and equipment status
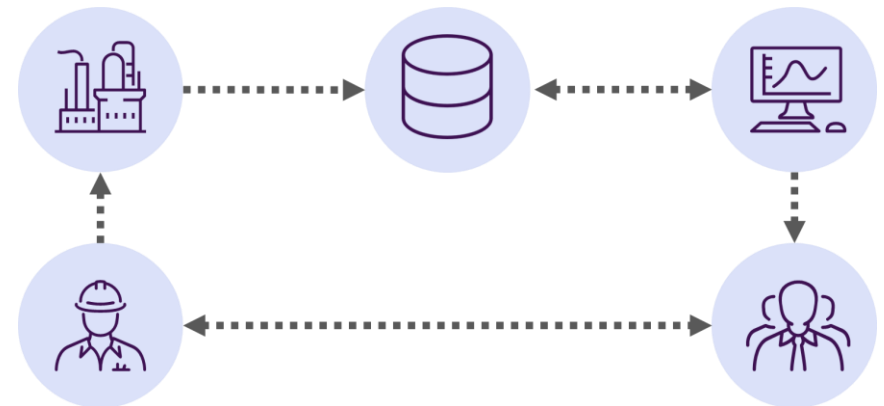
- Delivering data to the right people at the right time

TSQ ATL

Source: International Paper – Corporate Communications

AVEVA

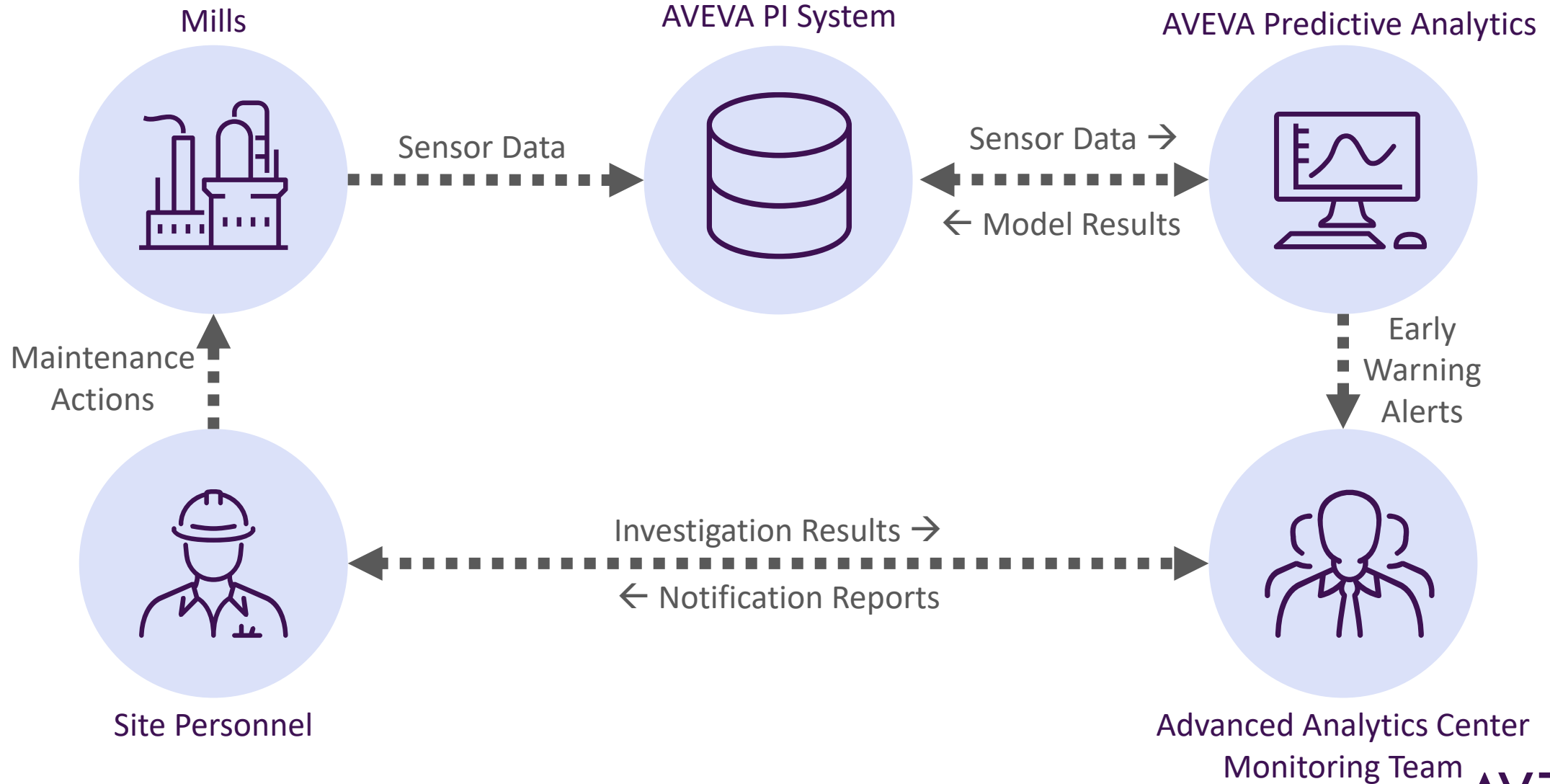# Equipment Health Monitoring by the Numbers

Since April 2020

- 6,200 sensors installed

- 800 assets being monitored

  o ~25 asset classes (pumps, rolls, blowers, gearbox, etc...)

- 1,250 active APR models

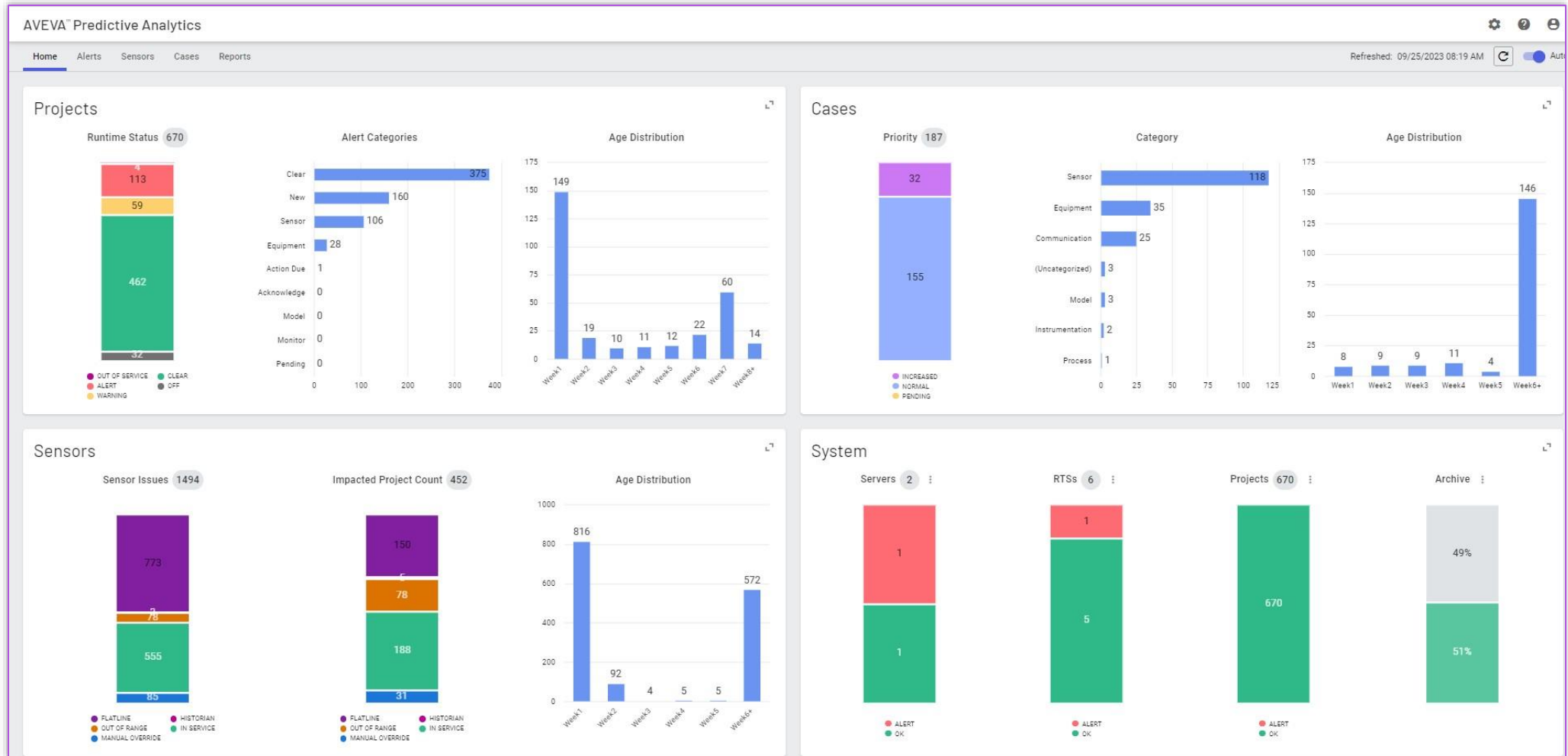- 20,000 PI Tags connected to predictive analytics

Source: International Paper – Corporate Communications

Solution Architecture

Mills

AVEVA PI System

AVEVA Predictive Analytics

Sensor Data

Sensor Data →

← Model Results

Early Warning Alerts

Maintenance Actions

Investigation Results →

← Notification Reports

Site Personnel

Advanced Analytics Center Monitoring Team

AVEVA

AVEVA™ Predictive Analytics (Dashboard)

AVEVA™ Predictive Analytics (Model Status)

Continuous On-Line Monitoring

Challenge:

- Dramatically reduce / virtually eliminate unplanned failures of critical rotating equipment at our pulp & paper manufacturing sites.
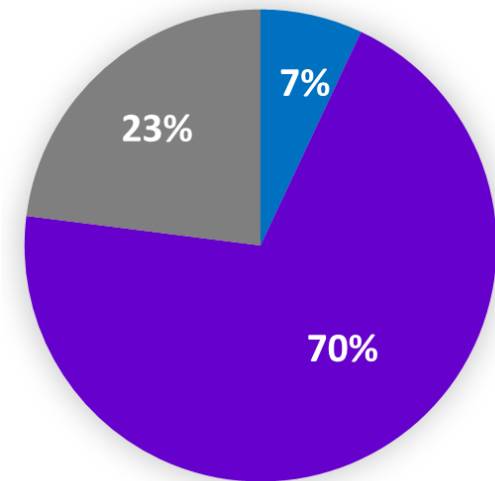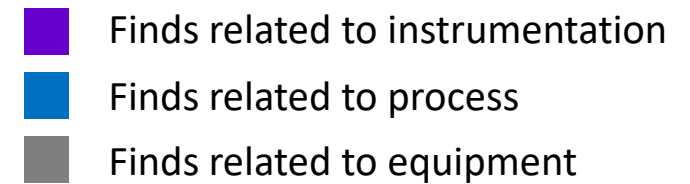
Solution:

- Our COLM project combines equipment criticality, reliability incident data, advanced sensors data, and real-time operating data using the AVEVA PI archive and AVEVA Predictive Analytics platforms

- ## Results

  - Reliability incidents were reduce by 70%

  - Downtime hours were reduced by 77%

  For monitored equipment: (2 year baseline vs 2 year results)

- Finds related to instrumentation
- Finds related to process
- Finds related to equipment

AV∃VA

More Information

Mill of the Future

Advanced Analytics Center

[Scan below to learn more!](#)

Source: International Paper – Corporate Communications

AVEVA

Allen Turner

Manager, Remote Analytics

- International Paper – Advanced Analytics Center
- Allen.Turner@ipaper.com

AVΞVA

Questions?

Please wait for the microphone.

State your name and company.

Please remember to...

Navigate to this session in the mobile app to complete the survey.

Thank you!

AVEVA

linkedin.com/company/aveva

@avevagroup

ABOUT AVEVA

AVEVA is a world leader in industrial software, providing engineering and operational solutions across multiple industries, including oil and gas, chemical, pharmaceutical, power and utilities, marine, renewables, and food and beverage. Our agnostic and open architecture helps organizations design, build, operate, maintain and optimize the complete lifecycle of complex industrial assets, from production plants and offshore platforms to manufactured consumer goods.

Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life's essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world's most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. The company is headquartered in Cambridge, UK.

Learn more at www.aveva.com

AVEVA