

THE PdM PAPER

The Newsletter of Symphony Industrial AI



Note from the Editor

Carolyn Bordini

We didn't let 2020 slow us down – we've kicked off 2021 with a bang! Our products have won multiple awards, and while we're just over a month into the year, we've already hosted multiple events with industry leading partners. Don't worry, the education lineup doesn't stop there – our PdM talk schedule through April is listed below. You'll see that we've changed our name, so make note in your

contacts of our new email address and website! We've also focused heavily on recruiting the past few months to continuously expand our development team to roll out new products and support our ever-growing list of contracts. Read below on how our Predictive Portal sets us apart and check out why our wireless sensor is the one you want protecting your assets. Looking forward to a great year with you!

New Website: <https://SymphonyIndustrial.AI> New Email Domain: @SymphonyIndustrial.AI

FEBRUARY ARTICLES:

Letter from the CEO

Understanding Your Health Score

Impact Detection Wireless Sensors

Channel Partners

Upcoming Events

Awards Update

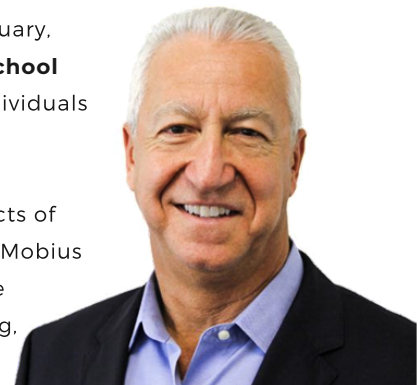


Letter From the CEO: Company Name Change Announcement

I am delighted to announce that our company name has changed from Symphony AzimaAI to Symphony Industrial AI. The word "industrial" is a better reflection of the market we serve and the breadth of capabilities we are planning to bring to it.

We are off to fantastic start to 2021. During January, our **PdM & Process Conference & AI Winter School Events** were attended by over 600 hundred individuals from around the world.

The Conference focused on the important aspects of staff and training. Jason Tranter, founder of the Mobius Institute, and Bill Pryor of the Vibration Institute discussed best practices in condition monitoring, and how staff need to maintain skills.



Randy Carlisle, National Reliability Manager for Airgas; Tim Hunt, Reliability Process Specialist for Logan Aluminum; and Dan Kernan, Executive Director, Product Management and Technology for IIT Goulds Pumps discussed the tangible economic results companies can achieve by analyzing machine condition data and deploying predictive maintenance solutions. Matt Gentzel of McKinsey & Company spoke about unlocking the potential in tech-enabled maintenance and reliability. The rapid evolution of Symphony Industrial's mission to deliver prediction, prescription and autonomous operation was presented.

We have been busy readying this year's most expansive product and services offering ever, which will include AI driven vibration set up and analysis, a low cost, high resolution wireless offering, a rapid evolution of our asset health & process solutions and finally, a unique token licensing system which offers incredible flexibility for our users to take advantage of the broad range of products and services we are delivering.

Going forward, we are rolling out a 15-part series for PdM Talks, which is focused on helping our users better understand the depth of our capabilities and its potential impact on their business. We also hosted an AI Primer Virtual Executive Breakfast on February 17th, which was a great chance for Director level and above to understand a bit more about AI and its application to manufacturing.

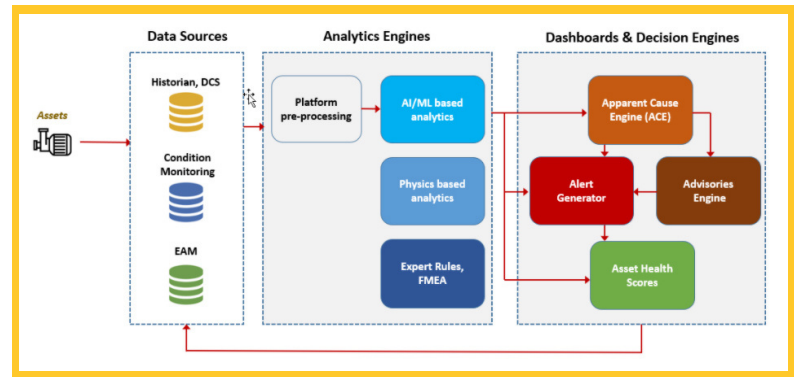
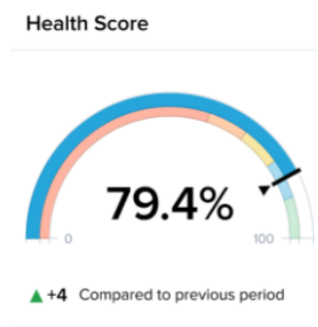
Wishing you a safe and prosperous 2021! -Dominic Gallello-

UNDERSTANDING YOUR HEALTH SCORE

PredictivePortal™

The PredictivePortal from Symphony Industrial AI provides a simple view of an asset's overall health based on a variety of inputs. This Health Score is also applied to a process that may include multiple assets and

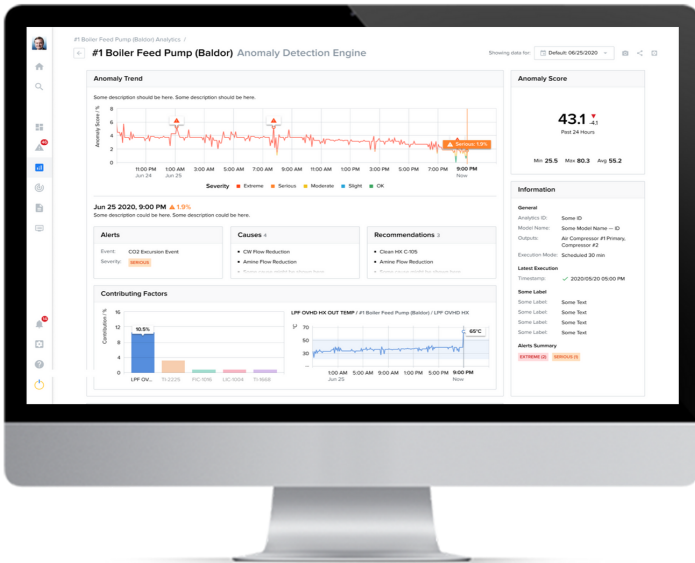
other process data sources, to an area which may be physical or system grouping of assets, and plant or multiple plants of an enterprise. Health Score gives you quick visibility to respond to risks to production.



Asset Health Score includes vibration data using the **Watchman 360™** products, which includes portable vibration data collectors and permanently installed wired and wireless vibration acquisition hardware, wireless high-resolution triaxial sensors, and other vibration sources through API integrations. Vibration data is analyzed through a powerful automated diagnostic engine to provide an accurate early detection of emerging faults with prioritized recommended actions.

By connecting other data sources using the **APM 360™** product, connectors such as other PdM technologies or sources, historians, EAM and Scada systems, and other open API connectors, Health Score can include a variety of component Impact Factors to better understand what is driving the current health. These contributing factors are configured through a template library available through the PredictivePortal platform or can be customized through a self-service workbench that includes developer tools, model builder, and exploratory data analysis.

To optimize Health Score and thus improve throughput, and efficiency, the Performance 360™ product integration adds a powerful set of AI models to ensure you are gaining the best performance from your plant. Whereas Watchman 360 is asset plus component reliability focus and APM 360 is asset-based availability and uptime focus, Performance 360 is a system-wide product to optimize process yield. With Symphony Industrial AI's PredictivePortal you gain data analysis to filter, apply noise removal, add text analytics to read text-based logs, and descriptive analytics for operating patterns. The PredictivePortal gives you prediction with supervised and unsupervised techniques to train models to find anomalies in assets, apply process forecasting and add soft-sensing of process parameters. Users of PredictivePortal have access to a vast library of rules, FMEA models to act on anomalies and connect to defect causes and advisory recommendations.



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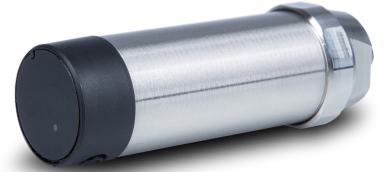
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Health Score derives its power from an advanced, 3rd generation AI platform called Eureka AI. An extensive FMEA library and Expert Rules is coupled with AI and physics-based analytics to determine the health score, identify anomalous behavior, find apparent causes for the anomalous behavior, and produce actionable recommendations. The AI engine can also forecast asset or process health with and without corrective actions being taken and predict overall outcomes. Through the PredictivePortal, all asset managers and decision makers can be notified of issues based on Health Score and other factors. A simple web interface draws attention to what's important, presents plain language repair actions, can be shared or assigned, and has a work flow to ensure completion. For more information on Health Score, PredictivePortal, and all software and services offered by [Symphony Industrial AI](#), -Michael DeMaria-

IMPACT DETECTION

Wireless Sensors



One important but often ignored aspect of vibration analysis is impact detection. Impact detection is key to early fault perception in bearing faults, gear faults and any metal-to-metal scuffing; it additionally gives insight into the severity and progression of these faults throughout later fault stages.

Impacts in vibration analysis are difficult to detect and often ignored, particularly in many of the new wireless sensors flooding the market today that are generally in the ~2-3kHz bandwidth range with sample rates up to 8kHz * without impact detection capabilities (or low impact detection capabilities).

Common machine faults, such as balance or alignment, cause low frequency machine motion (also known as whole body vibration). However, impacts travel through metal as stress waves, which are micro distortions akin to ripples on a pond and only last microseconds. This requires a wireless sensor capable of high sample rate and high-resolution, able to deliver the minimum following parameters:

- **Sample rate; >25,000hz (samples per second)**
- **Sample size (per test): >100,000 samples slow speed shafts require longer sample sizes**
- **A compression algorithm to decimate large samples but preserve impacting amplitudes.**

***Note: Since the relation between Sample Rate (SR) and Bandwidth (BW) are often interchanged in various sensor specifications, please use the following conversion: $SR = BW \times 2.56$**



Wireless sensors with adequate sample rate and resolution have only recently become available. Even so, the remaining problem is handling these extremely large data sets in a wireless environment. Trying to move large samples across a wireless network ties up precious bandwidth and significantly reduces expected sensor battery life.

Symphony Industrial AI uses the proprietary Impact Demod algorithm for this function so actual maximum impact values are preserved during compression, resulting in impact detection with a manageable sample size (~2,048 samples) to be transmitted for analysis. This allows stress wave data to be captured, transmitted, and stored right along with other standard low frequency vibration readings, giving the ability to have full machine vibration condition insights across the widest range of failure types.

It is important to ensure that whatever wireless sensor or data collection system that you choose can collect and display standard low frequency machine “whole body” vibration and is capable of high resolution / high sampling rate data (>25,000Hz SR) for impact detection. Additionally, it should employ a proven compression methodology such as Impact Demod to preserve the impact data (microsecond stress waves) into a usable sample size.

-Steven Hudson-

to represent Emerson’s products for the Oil & Gas segments, where the company had only 5% of participation. From 2000 to 2014, Fluxo increased market participation in Brazil to 85%.

The third phase of investment was focused in customer services, where FLuxo built several service contracts based on availability to its main customers. In these contracts, Fluxo was responsible to maintain a facility specific area (i.e. has 5 maintenance contracts for actuated valves of terminals and refineries), assuming complete maintenance of that area and taking care of the preventive and predictive maintenance, including spare parts.

Today, Fluxo’s main focus is in liquid & gas terminals application systems (skidded fiscal metering systems, skidded loading & offloading systems, vapor & recovery and burning systems) and in FPSOs (fiscal metering systems, chemical injection systems and other). Fluxo also supplies complete cogeneration system utilizing biogas and NG for Municipal companies, with biogas produced by waste products. They have micro-turbine systems to produce heat or cool, which complement the electricity generation for food industries, hotels, shopping centers, etc.

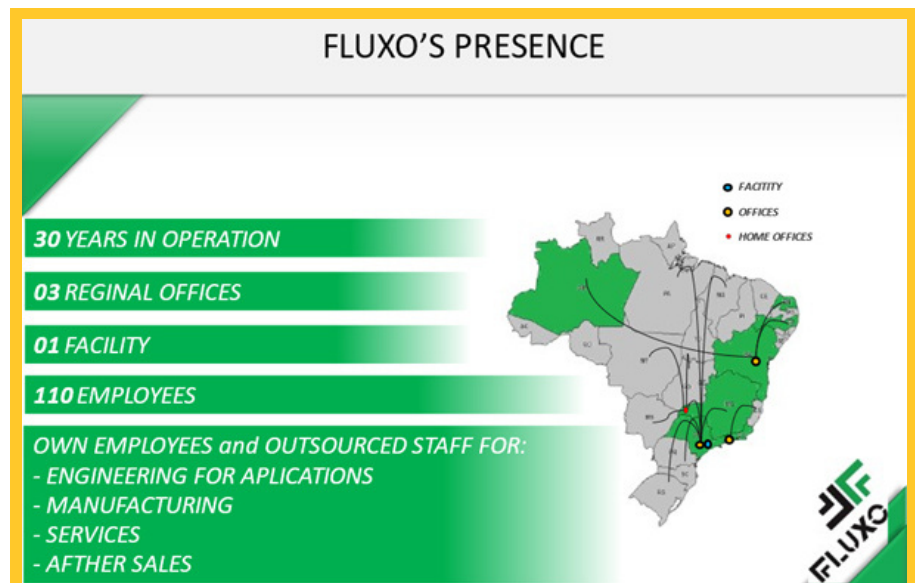
As for the latest evolution/innovation as solution provider, Fluxo recently created its Digital Transformation Department, which focuses on supporting clients to plan, develop and implement solutions for IIoT, Machine Learning, Artificial Intelligence partnering with Symphony Industrial AI, Realwear and OverIT.

CHANNEL PARTNERS

New International Sales Partner

Fluxo Soluções Integradas started its activities in Brazil 33 years ago, in tank farms and terminals. Fluxo has been a leader in bringing innovative solutions to Brazil: flow computer metering systems in the ethanol industry (replacing old weight measurements process), VRU - vapor recovery system (Jordan/US), tank monitoring system using radar (SAAB from Sweden), two wire valves control systems (Limitorque and Rotork), and automatic sampling and blending systems (Jiskoot).

The second phase of Fluxo’s activities started when SAAB was sold to Emerson. At that time, Fluxo had SAAB radar technology deployed in 70% of the Brazilian tank farms, and because of that Fluxo started



Clients are Fluxo's main focus, supporting them with aftermarket services, and trained and certified engineers from all partners and affiliates.

Fluxo will support Symphony Industrial AI's expanded operations in Brazil, leveraging their strong knowledge and domain expertise, driving continued success of Symphony Industrial AI's AI-based platform of solutions for asset health, asset performance management and manufacturing process performance optimization that supports customers as they navigate through their Digital Transformation.

-Romeu Kleinubing-



UPCOMING EVENTS



Join us for informative talks every week!

- **February 24th:** Improve Rotary Kiln Operations with AI
- **February 25th:** Dynamic Balancing Tips & Tricks
- **March 3rd:** Bearing fault detection on slow speed machines
- **March 10th:** Accelerating Furnace Performance with AI
- **March 17th:** High Frequency Wireless for Prediction & Prescription
- **March 18th:** Digital Twins for Remaining Days to Failure & What-if Performance Analysis
- **March 24th:** A Scalable AI and IoT Platform for Manufacturing
- **March 31st:** Seven Ways to Build Communication into your PdM Program
- **April 7th:** Grinding Mill AI Optimizer for Mining
- **April 14th:** Effective Remote CBM Start-ups
- **April 15th:** Energy Efficient Smelter Operations with AI
- **April 21st:** Digital Twins for performance with AI and FMEA

[VIEW EVENTS & REGISTER >>](#)

AWARD UPDATE

We're proud to announce we've won three high honors this past year.

OIL & GAS ENGINEERING DOUBLE GOLD PRODUCT AWARDS

Symphony Industrial AI announced its APM 360™ and Performance 360™ has been voted the best new products of 2020 by the readers of Oil & Gas Engineering.

[Read Full Press Release](#)



SYMPHONY INDUSTRIAL AI TAKES GRAND WINNER IN CONTROL ENGINEERING ENGINEER'S CHOICE AWARDS

Symphony Industrial AI was selected the GRAND WINNER in Control Engineering Engineer's Choice Awards, with Performance 360™ receiving the most user votes of any product entered in all categories. [Read Full Press Release](#)



For 50+ years, SIAI have been innovators of industrial insight – from machine component health to plant performance optimization. This has been enabled by a talented and rapidly growing team of deep domain experts in process industries, discrete manufacturing, IIoT, and artificial intelligence. Our solutions span Predictive Maintenance and Process Health & Optimization, including data acquisition devices and software.

 **SYMPHONY
INDUSTRIAL AI**

