

PreMA

Predictive Machinery Analyzer ~
flexible, trusted, end-to-end platform



Designed and Developed by
Dundics Enterprises, Inc.

Distributed by Signar LLC

Predictive Analytics Opportunity

According to researchers, 70 billion connected devices by 2027 and the potential economic impact of Artificial Intelligence/Machine Learning (AI/ML) technologies applied to maintenance process will be between \$2.7 to \$6.2 trillion per year by 2055

Predictive Analytics

Predictive Analytics describes a world in which everyday objects are embedded with tiny computers that can monitor surroundings, analyze, display information, and perform actions with some degree of autonomy. Predictive Analytics uses the network of sensors and actuators integrated with AI/ML technologies that work smarter, assess current and future conditions, thanks to the right set of data they collect for processing, analysis, and real-time decision management.

Challenges

All military and commercial machinery systems are composed of equipment that has various degrees of criticality in supporting the intended mission of the platform on which they are installed. The criticality is governed by both its contribution to the required functions necessary in the execution of the mission, as well as the level of redundancy available in the system design. The impact to machinery system readiness to support planned requirements arises from two primary failures:

1. The inability of equipment to perform its intended functions within specified requirements due to the deterioration of one or more of its known failure modes
2. The inability of the logistic support processes to efficiently respond to equipment needs

Dundics Enterprises, Inc - Engineering driven corporation that wants to Shape the Future of AI Predictive Maintenance by building a world where AI/ML based intelligent (industrial) machines are interconnected and work alongside humans augmenting human expertise from plant floors to deck plates around the world.

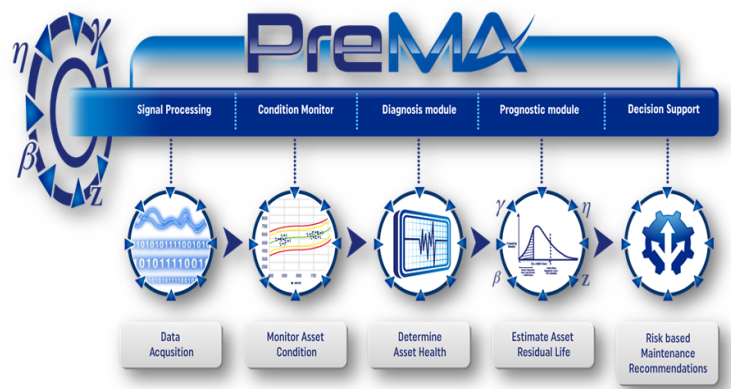
A leader in industry - with over 43 years of experience, trusted by customers like US Navy, GE Power Systems, Chevron Shipping, etc., to deploy its Artificial Intelligence/ Machine Learning (AI/ML)-based Predictive Machinery Analyzer (PreMA) solution.

Solution

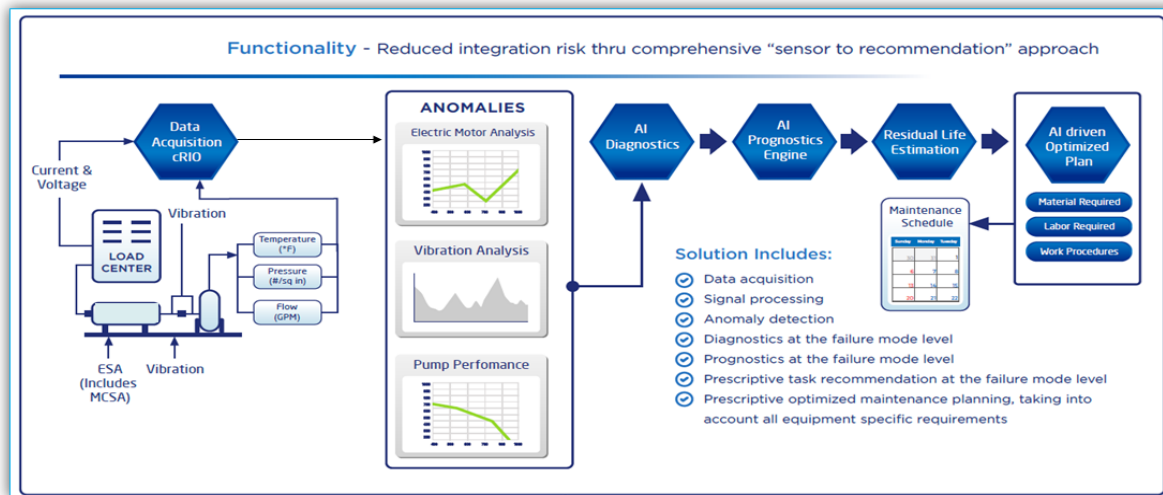
The PreMA Platform implements ISO-13374, Condition Monitory and Diagnostics of Machines.

It provides full autonomy between the analytics modules - No human involvement in system functions.

It provides what, when, and why a maintenance action should be performed.



Dynamic Remaining Useful Life—Powered by PreMA



- Integrates with all the data sources on the ship - Machinery Control System sensors & Unique CBM Sensors
- Integrates third-party analytics such as: Hull Monitoring and Noise and Vibration Management System (NVMS) (a first for US Navy ships for the FFG 62 Class)
- Provides AI/ML solution that:
 - Performs Autonomous Anomaly Detection, Diagnostics, and Remaining Useful Life (RUL) of equipment components down to failure modes.
 - Performs Autonomous Advance Planning and Scheduling that uses RUL and all other material requirements (programs, certifications, PM, Corrective, etc.) to deliver an optimized schedule for short-term and long-term maintenance requirements for up to 3 years.
 - Provides Mission Risks Status & Recommended Mitigation including Adjustment to Equipment Lineup to preserve Mission

Engineering Expertise	Automatic Analysis Dynamic Remaining Useful Life Calculation	Advance Machine Learning
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PreMA is based on an Engineering Solution, only utilizing those elements of Big Data that provide value to the decision management process.

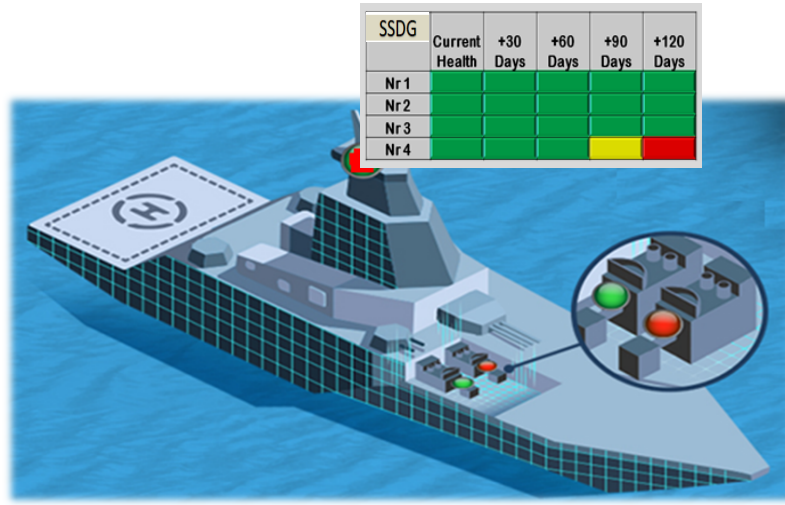
Broad range of academic and experiential resources based within a single organization: PhD in Reliability Engineering, Electrical Engineering, Nuclear Engineering, Mechanical Engineering, Software Engineering.
Plant Engineers, Business and Administration Professionals.

PreMA's primary functionality is to provide continuous insight into present and future health of equipment components. Prognostics is the key functionality needed to move to an integrated predictive maintenance process. Maintenance actions are synchronized with the overall business operational requirements of the system, as well as with the necessary maintenance resources and spare parts provisioning.

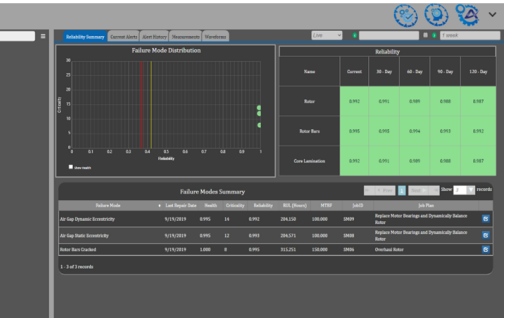
Deploying advanced machine learning methodologies coupled with reliability engineering-based application of AI.

We combine the Engineering Expertise with our Data Scientists' understanding of the evolving IoT and Cloud Space computing, to provide our clients the best analytics solution for their environment.

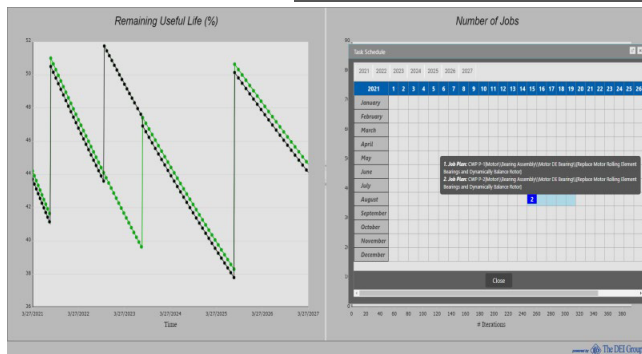
Engineering approach, combined with state of the art Data Analytics



Overall asset health scores in real-time and in 30/60/90/120 days



Drill down to better understand the measurements driving the results or zoom in on a failure mode of interest



The Maintenance Optimization function provides results of the AI Genetic Algorithm (GA)-based recommendation of work scope during the predefined maintenance availabilities, such that Component Remaining Useful Life (RUL) does not drop below a predetermined risk level to assure Mission Success.

Market Expertise

Extensive Knowledge of a wide range of Equipment in diverse operational environments: Maritime, Power, and Nuclear

Solutions Expertise

- Configurable, customizable, and scalable to address unique system/equipment requirements for ship applications
- Secure web-based application allows multiple user access from anywhere
- Extensive Equipment design and reliability attributes
- Library of over 5000 types equipment for reuse

CBM Smart Sensors Expertise

Native integration of third-party sensors:

- Online electrical signature analysis (ESA)
- Online lube oil monitoring
- Online diesel generator health monitoring
- Online motor monitoring
- Online vibration monitoring
- Online breaker monitoring
- Online transformer monitoring
- Power quality monitoring