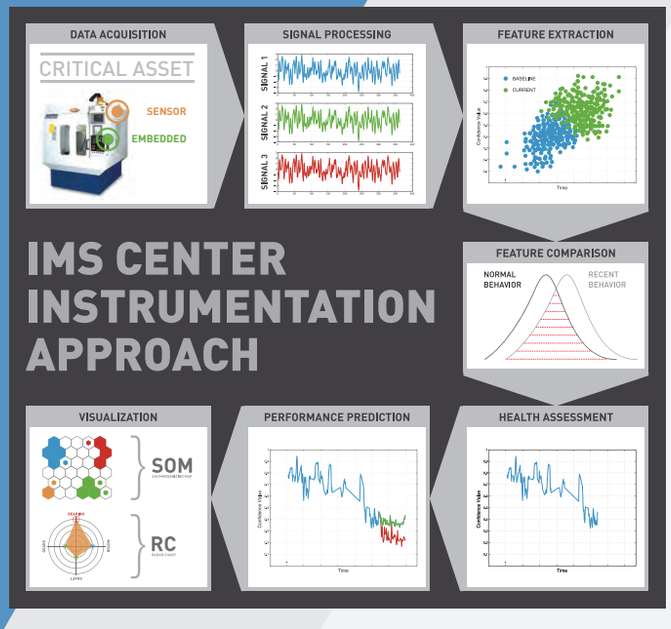
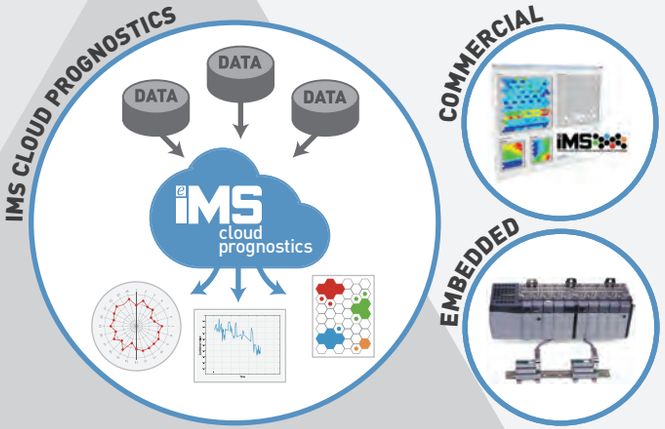


INSTRUMENTATION APPROACH

This standardized approach greatly increases the adaptability, while also accelerating development and deployment, of prognostics & health management solutions.

PLATFORM INDEPENDENCE

The Center's tools can be reconfigured for use on many platforms or software languages. Currently the Center focuses on commercially available platforms, embedded solutions and cloud-based prognostics.



THE WATCHDOG AGENT® TOOLBOX

The Watchdog Agent® is the IMS Center's collection of tools and methods for prognostics and health management (PHM). The toolbox can be customized and reconfigured for virtually any application—from products and equipment, to complex systems or manufacturing lines.

HEALTH ASSESSMENT	
Logistic Regression	Neural Networks
Statistical Pattern Recognition	Gaussian Mixture Model
Self-organizing Maps	Auto-Associative NN

HEALTH DIAGNOSIS	
Support Vector Machine	Bayesian Belief Network
Self-organizing Maps	Hidden Markov Model

SIGNAL PROCESSING & FEATURE EXTRACTION	
Time Domain Analysis	Wavelet Analysis
Frequency Domain Analysis	Principal Component Analysis
Time-frequency Analysis	Expert Extracted Features

PERFORMANCE PREDICTION	
Autoregressive Moving Average	Match Matrix
Recurrent Neural Network	Trajectory Similarity-based

The Watchdog Agent® toolbox contains four categories of analytical tools that assess and predict performance or failures of machines and processes, by extracting and analyzing performance-related features from inputs such as sensor data, controller signals, expert knowledge, etc. Prediction results are then used for maintenance decision making and infrastructure operations.

DECISION SUPPORT TOOLS

Decision Support Tools (DSTs) facilitate maintenance operations in the most production-efficient manner when one or more machines are likely to fail, according to the prediction made by prognostic algorithms. They prioritize maintenance work-orders and balance limited resources by minimizing possible losses in productivity due to unplanned downtime.

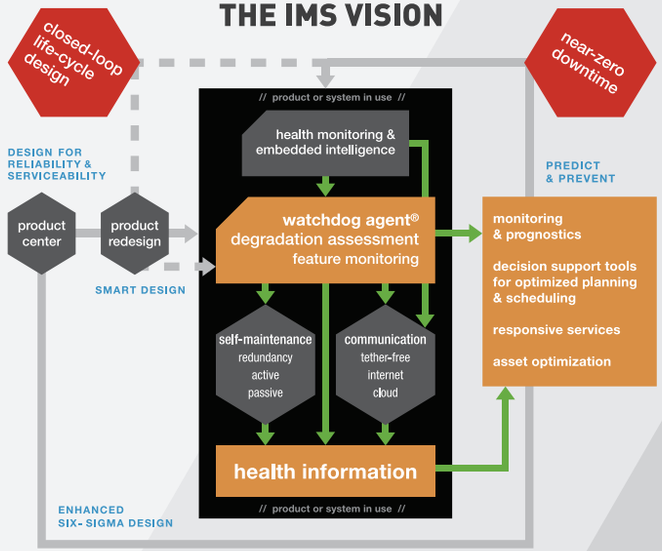
iMS

CENTER FOR INTELLIGENT MAINTENANCE SYSTEMS

THE FUTURE OF MAINTENANCE

The future of maintenance is a smart system that enables equipment to achieve and sustain near-zero breakdown performance with self-maintenance capabilities, and ultimately to realize the autonomous transformation of raw data to useful information for improved reliability, productivity, and asset utilization. The IMS Center's vision is to transform the traditional "fail & fix" maintenance practices to "predict & prevent" by focusing on frontier technologies in embedded and remote monitoring, prognostics, and intelligent decision support tools.

THE IMS VISION



HISTORY

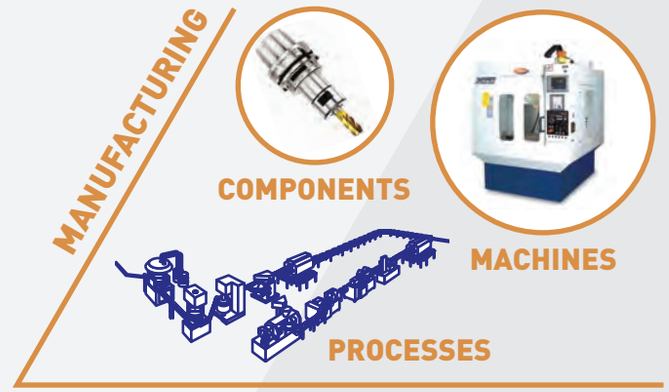
The IMS Center is an NSF Industry/University Cooperative Research Center that consists of the University of Cincinnati, the University of Michigan, Missouri University of Science & Technology. Since 2001, the Center conducted over 100 projects in partnership with over 100 international organizations. The Center was ranked the best on the 2012 NSF I/UCRC Economic Impact Study.

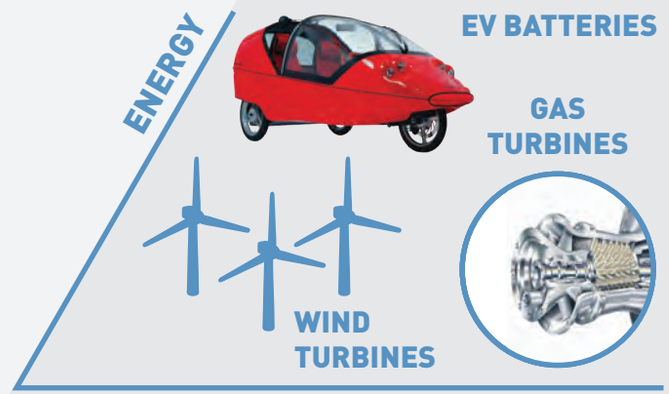
IMS GLOBAL PARTNERS

During the past 10 years, the IMS Center has been working closely with more than 30 research institutions and over 70 industry partners, worldwide.

APPLICATIONS

Standardized methodologies, platform independence and the reconfigurable nature of the Watchdog Agent® platform have enabled the development and deployment of next-generation maintenance solutions in many diverse applications.





THE IMS CENTER
UNIVERSITY OF CINCINNATI
RHODES HALL 560
CINCINNATI, OH 45221, USA
PH: 513.556.3412
CONTACT@IMSCENTER.NET
WWW.IMSCENTER.NET

SINCE 2001
NSF INDUSTRY / UNIVERSITY
COOPERATIVE RESEARCH CENTER

MEMBER BENEFITS

- IMS technologies & methodologies
- Company-specific projects
- IMS researchers for internships
- Consulting & training opportunities
- Share best practices & experiences
- Extensive networking opportunities
- At least 30:1 leveraging ratio