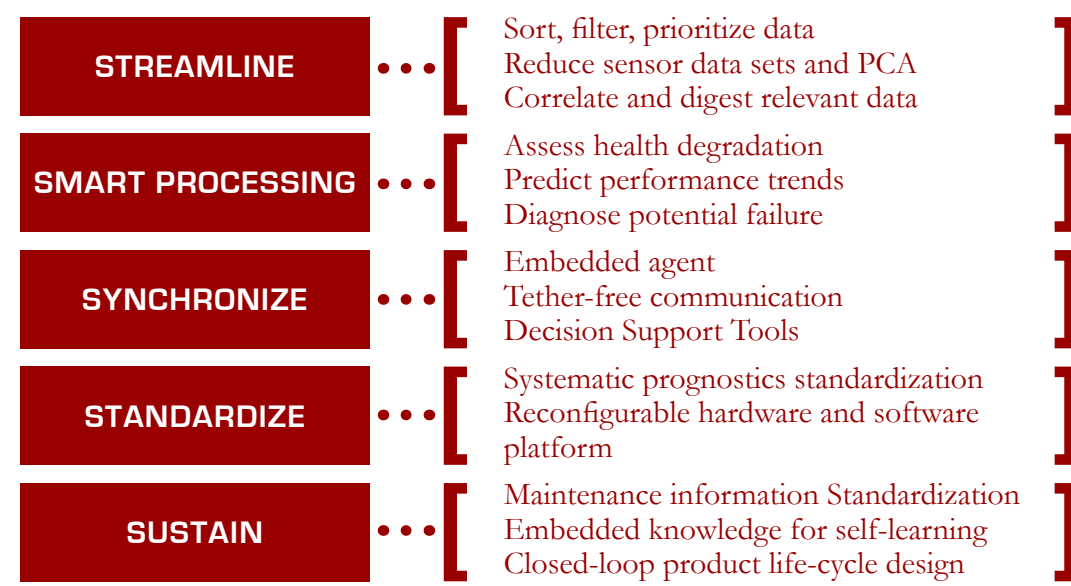## CORE TECHNOLOGIES //

Since 2001, the NSF Industry/University Cooperative Research Center (I/UCRC) for Intelligent Maintenance Systems (IMS) is a leader in developing tools, technologies and methods for enabling product and systems to achieve and sustain near-zero breakdown performance.
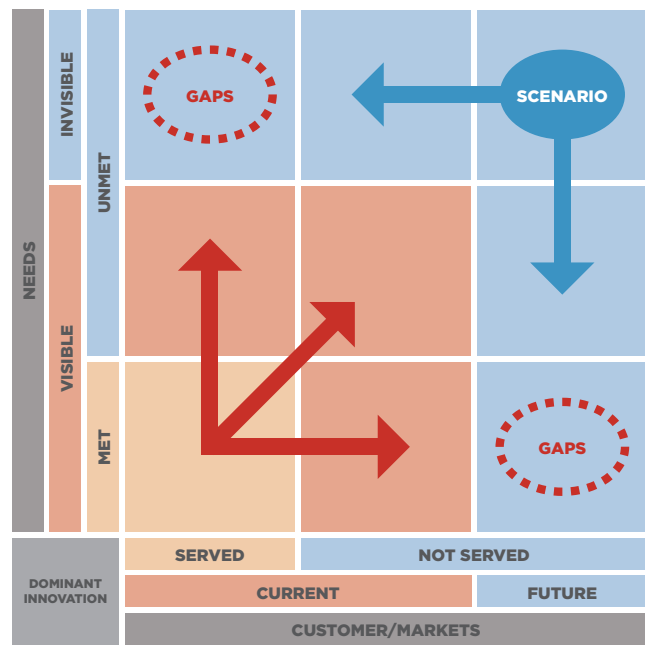
WATCHDOG AGENT®

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

5S APPROACH

The "5S" approach was devised by the IMS Center in order to address the needs of future maintenance services. This systematic approach consists of five key elements: Streamline, Smart Processing, Synchronize, Standardize and Sustain.

STREAMLINE ··· [Sort, filter, prioritize data / Reduce sensor data sets and PCA / Correlate and digest relevant data]

SMART PROCESSING ··· [Assess health degradation / Predict performance trends / Diagnose potential failure]

SYNCHRONIZE ··· [Embedded agent / Tether-free communication / Decision Support Tools]

STANDARDIZE ··· [Systematic prognostics standardization / Reconfigurable hardware and software platform]

SUSTAIN ··· [Maintenance information Standardization / Embedded knowledge for self-learning / Closed-loop product life-cycle design]

DOMINANT INNOVATION

Innovation is not just about new product development, but it also refers to the creation of new value-added services to achieve better productivity and performance. The IMS Center works with its members to develop such services and transform an existing business into a smart product service business.

APPLICATIONS //

The tools and methods developed by the IMS Center have been validated in the over 70 projects that the Center has conducted with its members and research partners. These projects have involved a wide range of applications for many diverse industries.

MANUFACTURING

The IMS Center has conducted numerous projects involving many different aspects of the manufacturing process with organizations such as: GE Aviation, General Motors, Omron, P&G and Toyota, among others.

ROTATING COMPONENTS

Many projects in the area of PHM for rotating components have been conducted by the IMS Center, such as the Smart Machine Platform Initiative (SMPI) project with TechSolve, as well as other machine tool-centric projects with Harley Davidson and Caterpillar.

ENERGY

Smart Battery: The Smart Battery Agent transforms batteries into information-rich energy-storage devices ("smart batteries") with enhanced functionality, including: embedded service capabilities; remote smart monitoring; and online management of batteries to ensure mobility for next-generation vehicles.

Wind Turbine PHM: Leveraging extensive experience with PHM solutions for rotating components, the IMS Center has developed tools and approaches predicting and managing useful life of Wind Turbine critical components.

Solar Panels: The IMS Center has recently expanded its research in PHM for semiconductor manufacturing to include predictive modeling for high performance and high-yield manufacturing of photovoltaics.

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eIMS

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Komatsu
Mitsubishi
Nissan
Omron Corp.
Toshiba

KOREA

Samsung

HONG KONG

Metron HK

INTERNATIONAL PARTNERS //

During the past 10 years, IMS Center has been working closely with around 30 research institutions and over 70 industry partners from all over the world.