

## System Design, Development, and Sustainment

Impact has developed an extensive array of engineering design, development, deployment, and verification/validation applications to facilitate rapid deployment, documentation, validation, and support of health management systems from asset point of contact and operations through maintenance and logistical support and planning.

### PHM Design™

PHM Design™ is a software tool focused on designing, developing, evaluating and deploying PHM/CBM systems. PHM Design models are constructed on system-level "Design Canvas" using sensors, algorithms, failure modes, symptoms, effects and maintenance tasks to fully represent PHM system analyses. The system organizes the PHM information and performs metric based analysis. The application of these metrics enables trade studies to answer difficult PHM/CBM design and development questions en route to allowing the user to develop cost-effective and accurate PHM systems.

### ReasonPro™

Impact has developed information management tools, advanced reasoning, and knowledge discovery techniques for fault isolation, ambiguity group reduction, faster test and repair, and improved logistics support for legacy and emerging avionic systems. These tools allow for incorporating Electronic Maintenance Action Forms (e-MAF) information and utilize open data connectivity for information capture context preservation.

### Common Smart Support Enhancements Net-Centric Enabled (S<sup>2</sup>ENCE) Maintenance

Impact Technologies is developing the next generation of reconfigurable and intelligent TPS that utilize a modular evidence-based reasoner. The modular architecture to the reasoner will allow rapid development of reasoning models enabling the expansion of the technology to additional weapon replaceable assemblies (WRAs). The reasoner will also incorporate autonomous learning, which will automatically update the reasoning models as new patterns emerge. The learning capability will eliminate the need for human-in-the-loop analyses and provide earlier detection and response to changing WRA performance trends.



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*Equal Opportunity Employer  
Comprehensive Benefits Package*



# e-PHM

## Impact Technologies

*"engineering prognostic solutions  
that improve equipment reliability and  
life cycle management"*



[impact-tek.com](http://impact-tek.com)

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## Company Overview

Impact Technologies, LLC is dedicated to developing advanced electronic prognostic and health management (e-PHM) technologies for a broad range of electronic domains including: RF, Processor (high speed digital), Power Electronic, Drive & Actuation, and Network/IT systems. The technologies are applicable to addressing the reliability, maintenance and life-cycle management requirements demanded for government, military and industrial platforms. Impact seeks to further commercialize and deploy these critical technologies in partnership with government and industry (1st/2nd tier OEMs) to provide e-PHM solutions for our customers.

### Application Domains

Impact's e-PHM technology suite supports an array of systems including:

- Radar
- Tactical and Mission
- Information and Communication
- Navigation and Control
- Weapons, Sighting, and Display

### Impact's innovative products and services supporting the fielding of e-PHM technology include:

- ReasonPro™ - Advanced Reasoning for Avionic Health Management
- PHM Design™ - Prognostic Health Management Design Software
- CBMi+™ - Condition-based Maintenance Monitoring Systems
- Common S<sup>2</sup>ENCE™ – Smart Support Enhancements Net-Centric Enabled Maintenance Software
- PBMS™ - Prescription based Maintenance Management System

*Serving customers globally, Impact Technologies is a leader in the development of cutting edge applications with the technical and creative ability to add value, reduce operating costs, and increase profitability across a wide range of industries and applications.*

## e-PHM Technology

Impact's Electronic Systems PHM group develops health monitoring and failure prediction technologies for electronic systems. Our array of technologies are customizable to diverse application domains. We provide robust, real-time solutions for e-PHM by incorporating dynamic physics-of-failure modeling with usage and signal monitoring. Building on a suite of diagnostic reasoning software for improved fault isolation permits Impact to develop and deploy PHM systems by connecting operational, maintenance and logistics elements to provide effective condition-based maintenance and predictive solutions for air, sea, and ground-based industrial and military platforms.

### Digital Processor

Impact has developed technology to assess the level of degradation in digital processors and provide a health assessment for the device. Exploiting only existing measurements and allowing for the monitoring of degradation on not only the processor, but the processor's individual functional units as well.

### RF/Digital Systems

Impact's "circuit-as-sensor" approach to RF/D system PHM enables degradation detection and health assessment utilizing existing system operational data, anomalous event detection and classification. The patent-pending technology is applicable to GPS, SDR and RADAR among other RF/mixed-mode topologies. Current efforts are focused on ATE-based product development capabilities.

### Information Technology (IT) Systems

Impact has developed PHM algorithms for IT systems to detect faulty operation through characterization of system performance under various configurations. Advanced detection algorithms track changes and identify anomalous behavior at specific nodes. A learning ability allows detection software to adapt to various systems.

## e-PHM Technology Cont.

### Drive & Actuation Electronics

Impact has developed innovative self-healing and fault-tolerant technologies for power drives and electrical machines. The new techniques provide for in-situ feature monitoring and health assessment of critical devices such as IGBT's, and allow for real-time control law adaptation to maximize system functionality. These technologies have been applied to provide diagnostic and predictive health capabilities for both aircraft actuation and power drive systems. The innovations are directly applicable to the next generation Navy ships with DDG and DDX platforms, other DoD related programs, and industrial applications.

### Power Supplies

Through SBIR efforts Impact has developed technology to detect and isolate faults in switched-mode power supplies prior to the unit going out of specification or flagging its own BIST. The technology has been encapsulated in depot-level automated test equipment (ATE). The technology is transitionable to on-platform embedded real-time implementation in support of verticality of test.



Integrated HW & SW Test Bench for Power Supply Health Assessment