Exhibit 2

## Asset Health Management

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The world political environment drives the need for small, rapidly deployable, mobile force structures with a resulting need for new logistical support concepts. In support of this need, the Department of Defense is introducing new weapon systems platforms that are both increasingly sophisticated to operate and maintain and that are expected to remain in service for many years. At the same time, Operations and Support and manpower costs are being pressured lower due to budget constraints, and existing systems are being required to operate well beyond their original design life.

Improved readiness of new and existing weapons platforms and improved battlefield information access are necessary to meet the military needs of the early 21st century.

The Department of Defense is developing and deploying information systems that will support the transmission, management, and global access to critical military information. This capability will provide a backbone for enterprise-wide systems for managing and ensuring equipment readiness (Asset Health Management). Asset Health Management encompasses a variety of technologies that will evolve and mature over time.

Embedded systems monitor equipment usage and health, maintain a platform life-cycle history, and can report periodically to command and control, logistics support, or fleet monitoring systems. A platform that reports its health allows a rapid reactive response to equipment problems. However, a platform that gives warnings of future failures or maintenance needs provides the ability to respond proactively to problems; a whole new paradigm for mission, operations, maintenance and logistics support planning is enabled.

Given health records for the available assets, mission planners can optimize asset assignment for all mission tasks based on the operational requirements and criticality of each task. In the case of an operational warning during mission execution the operator or mission planner can make informed decisions about completing, scrubbing or modifying the mission. By adding consumables to the data reported by the platform, unit re-supply efforts can be optimized and the supply chain footprint reduced.

Given warnings of upcoming failures of specific equipment, maintenance scheduling can be optimized and necessary replacement parts ordered; equipment readiness can be significantly improved. Failure severity, maintenance manpower, and replacement parts costs are also minimized by repairing systems prior to failure; secondary failures are prevented.

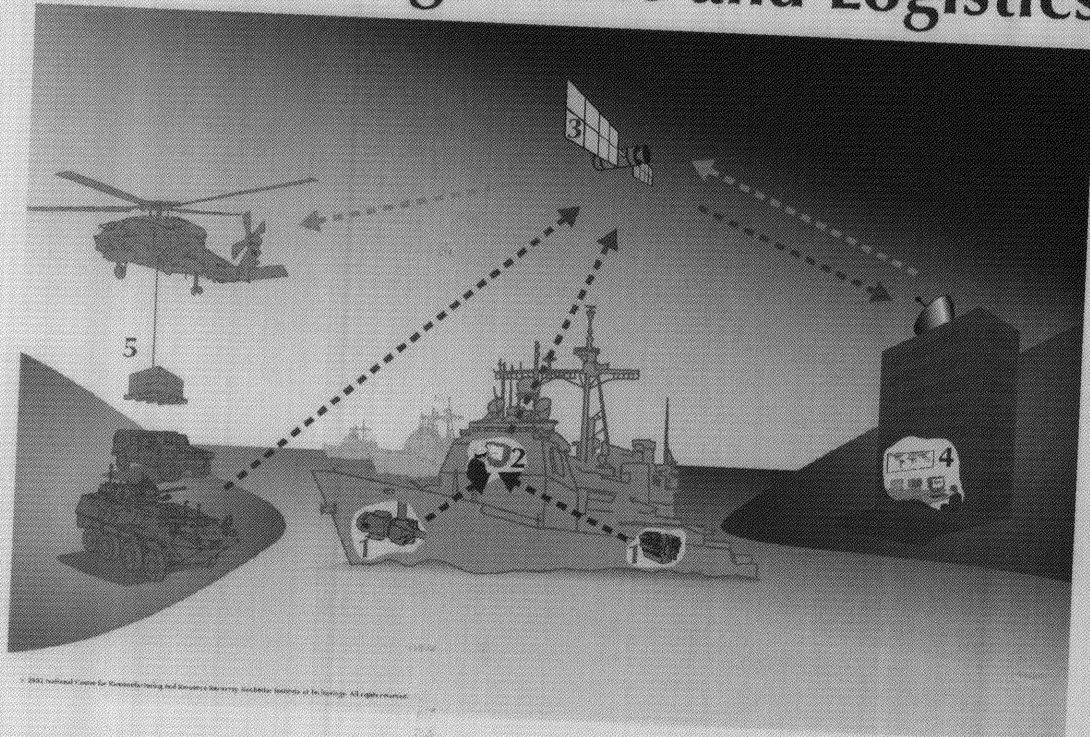
The health and usage data recorded on individual platforms can be incorporated into master databases owned by a fleet health manager. Access to this data enables fleet-wide decisions with respect to maintenance or overhaul intervals, engineering design changes, and supply system management.

Remote engineering support is a final capability that is made possible by Asset Health Management. If a field maintainer encounters a problem which he cannot diagnose or repair, he can open a support session with a remote platform expert to get assistance. Complex problems can be resolved correctly the first time, reducing maintenance effort and the potential for recurring faults.

## Asset Health Management Technologies at the National Center for Remanufacturing and Resource Recovery (NCR$^3$) at Rochester Institute of Technology

The NCR$^3$ Asset Health Management initiative is based on the strong foundation of industrial experience in remanufacturing, and sustainability and reliability engineering. A description of the associated Remote Diagnostics and Logistics vision is shown below.

# Remote Diagnostics and Logistics




**1 System Health Monitoring**

Sensors are placed on all key systems. Smart systems report their health based on sensor data. Considered data may include temperature, vibration, noise, contaminants in oil and other performance criteria.

**2 Platform Asset Management**

System health information is used to support decisions with respect to platform and equipment operation, maintenance, and life-cycle management.

**3 Platform Status Reporting**

Data transmitted from each platform includes only that information necessary for fleet monitoring, support and supply.

**4 Remote Support and Monitoring**

**Fleet Health and Operations Monitoring** — the ability to maintain extensive historical databases across the fleet enables knowledgeable personnel to make platform and fleet life-cycle decisions.

**Technical/Logistical Support** — on-platform personnel have access to remote government and contractor engineers for problem resolution. Actual or forecasted failures would trigger supply systems.

**5 Resupply**

Resources such as fuel, ammunition and in-field maintenance material are then transported to those platforms requiring support.

A critical element of system health monitoring is designing the system for the optimal cost/benefit ratio. On existing systems in particular, the monitoring system should make use of pre-existing sensors and signals. The cost of adding additional sensors needs to be weighed against the cost of the failures that they will detect and prevent. At the system health level, one of our technology focuses is the development of prognostic (failure prediction) approaches based upon material aging characteristics. Prognostics is an area of significant research need, and has a large potential payback.

Platform asset management is focused on supporting decisions with respect to operating and maintaining equipment. The benefits of advanced planning are enabled by methods of accurately predicting system failure. Different platforms have different needs in this area: ships have a great need for on-board asset management tools, while asset management for ground vehicles is usually done at central maintenance locations.

The key to platform status reporting is identifying the proper information set for various communication mechanisms. For real-time wireless data transmission, the data set must be optimized to convey the most possible information with the smallest amount of data. Special messages and communication modes must be designed to support occasional requirements for more detailed data. Communication protocols must also support rapid streaming of complete Asset Health databases when platforms return to their base.

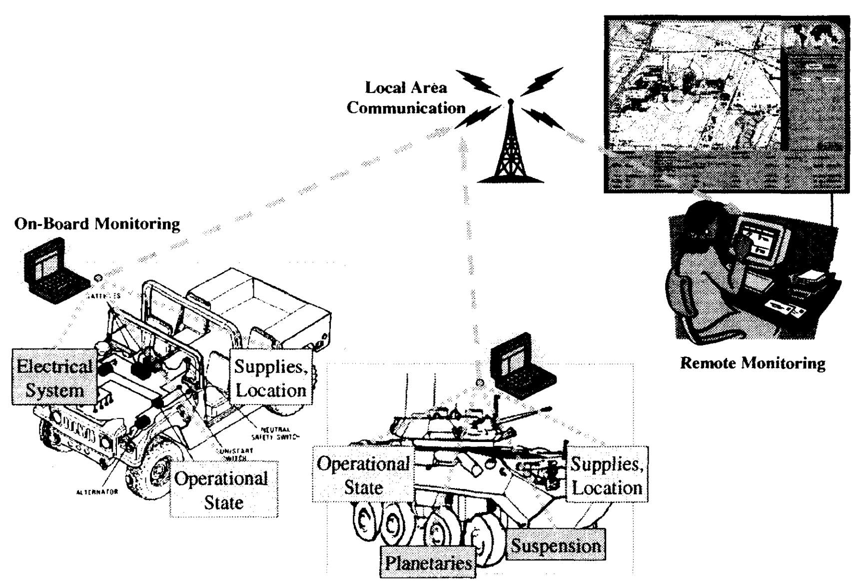
Our focus in the area of remote support and monitoring is to link the data generated on the platform, with platform life-cycle engineering decision support tools. These tools will aid the asset health managers in deciding when specific assets need to be overhauled, remanufactured, upgraded, or disposed of. Policies for fleet overhaul, remanufacture, upgrade, or disposal are also enabled by life-cycle engineering decision support tools.

NCR[3] has applied Asset Health Management technology to a variety of industrial applications. The most recent work involved the development of a test system to assess the health of automotive constant velocity joints. This program included the development of a unique hardware test methodology, as well as optimized data processing algorithms to quantify and qualify defects.

We are applying this experience, as well as industrial data acquisition and sensing experience to the development of Asset Health Management technologies for military ground vehicles. This will be a multi-year initiative that will increase in scope, and also interface with an Office of Naval Research development program in future years.

The pilot application will be applied to a High Mobility Multi-Wheeled Vehicle (HMMWV or humvee) on loan from the United States Marine Corps 8th Tank Battalion in Rochester, New York and two light-armored vehicles (LAVs) on loan from the United States Marine Corps Material Command in Albany, GA.

The primary focus of the pilot program is the development of prognostic (failure prediction) technologies for specific platform failure modes. Based on platform problem areas and discussions with vehicle program managers, we have selected the electrical system as the focus area on the HMMWV and the drive-train and suspension on the LAV.




The pilot includes an on-board monitoring system as well as local area wireless communication back to a remote command and control center. The on-board monitoring system will include the health of the targeted platform components, as well as tracking real-time operational data (e.g. speed, rpm, engine temperature), vehicle location, and consumable status (fuel and ammunition).

In subsequent years, we will expand the on-board monitoring to include additional platform subsystems. We will also interface the on-board monitoring system with the autonomic logistics system being developed by the Marine Corps and the Office of Naval Research. This ONR program is developing the communications architecture, command and control tools, and logistics support tools for Marine Corps expeditionary units. The on-vehicle monitoring system will provide the platform data to be used by the decision support tools for command and control and logistics.

An additional future effort will integrate the platform health data with a remote system for engineering decision support. The LEEDS (Life-cycle Engineering and Economic Decision Support) software system will provide decision support for Asset Health Management.