

**Integrated Reliability Programs  
=  
Integrated Data Management**

**White Paper**



**Design Maintenance Systems Inc.**

# Integrated Reliability Programs = Integrated Data Management

An Integrated Reliability program starts with the data collected by operators, mechanics, and lubrication technicians and continues through to data analysis and information dissemination by Reliability, Operations and Maintenance departments ending with decision making and prioritizing by Reliability, Operations, Maintenance, Sales / Marketing and Purchasing. At the primary level, the data collected from all asset care disciplines are brought together to make informed decisions that pertain specifically to asset life. At the secondary level, the disseminated information is spread throughout the corporation to the all departments that can utilize that information to make intelligent decisions to achieve corporate goals (profitability). The key element of this process is integrated data management - both within the reliability program (internal) and outward to the EAM/ERP/Control system used (external).

Integrated Data Management can take place in a variety of forms. The two main areas of integration can be grouped as internal and external. Internal integration brings multiple asset care disciplines together under a single system. Internal integration benefits the collection/analysis/distribution cycle specifically data, collection, data analysis and the distribution of the results. External integration concerns the exchanging of this data with existing ERP, EAM and plant operations systems. External integration greatly enhances the ability to use reliability information to manage maintenance and production scheduling. As a result integrated reliability processes make the decision-making process less costly and more accurate.

## About DMSI

For two decades, DMSI has been providing the tools industrial, military and transportation organizations need to get their maintenance programs up and running quickly with maximum value and minimal inconvenience. You may even have used our systems without ever hearing the name DMSI, because many of our products have been marketed through OEM relationships. In fact, DMSI is a leader in the number of installed maintenance systems worldwide. At DMSI, we are looking forward to helping you achieve your operations and maintenance goals more easily, efficiently and cost-effectively than ever before. DMSI is firmly established as an industry leader for integrated asset care and predictive maintenance. Our corporate headquarters is North Vancouver, BC with sales and support outlets throughout the US, Canada, UK/Ireland, South Africa, Benelux, Scandinavia, India and Korea.

## Integration Benefits

The following are case histories from companies that have integrated their reliability programs. The companies have asked DMSI to not disclose their names as the information is considered proprietary in nature.

### Case One: Paper Mill in Florida, USA

Integrated inspection program initiated in Woodyard in 1999.

- By 2003, 70% reduction in reactive repairs compared to 1998.
- Operators responsible for identifying over 25% of critical asset issues.
- Year-to-year maintenance budget reduced by over 35%.

### Case Two: Paper Mill in Virginia, USA

Integrated inspection program started in 1996 with one trial area using four handhelds.

- Trial program saw 35% increase in planned work in that area.
- Now over 130 handhelds in 8 areas – largest single-plant automated inspection program in world.
- Production up from 2200 tpd (6 PMs) to 2800 tpd (5 PMs) in the last five years and the inspection program is credited as the major contributor.

### Case Three: Refinery in Tennessee

Inspection program began (on paper) in 1999 but the integrated, automated system was installed in 2002. Interface to external process historian system added to system in 2003.

- MTBF for rotating equipment improved from 42 months to 53 months.
- Maintenance expense shifting from reactive maintenance to proactive work, moving to 15% unplanned from 80% unplanned.
- Savings - \$1 million dollars (US) in reduced maintenance costs per year.

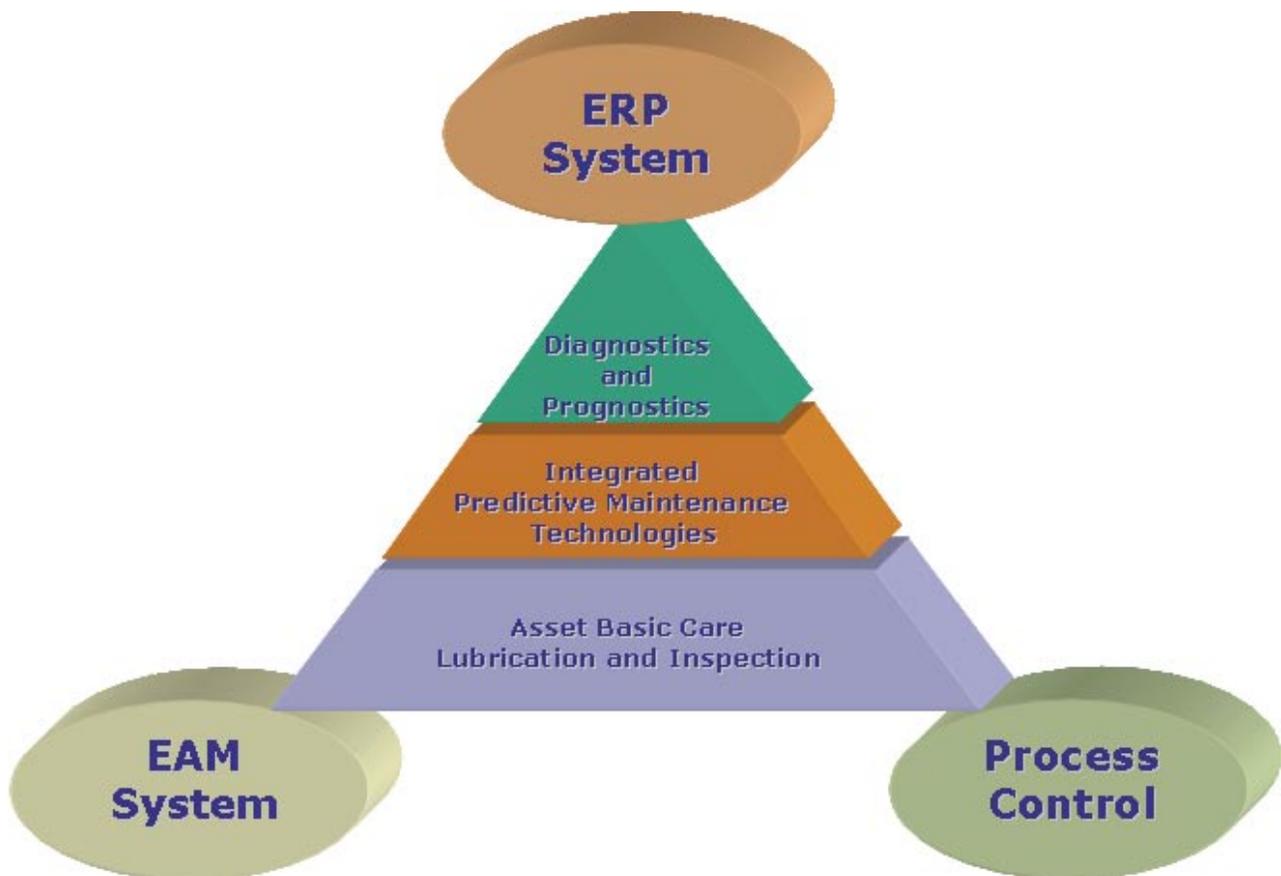
## Integrated Data Management

Integrated Data Management is one of the keys to a successful implementation of a corporate reliability program. In small, single plant environments, non-integrated reliability tools can be used independently, with little or no formal integration. However, in large or multi-plant environments, the effort of accessing and managing data from non-integrated reliability tools can quickly overwhelm the benefits of those tools.

Integration has the largest positive affect on processes involving plant personnel from different fields because it shifts the focus to a shared process from an individual departmental focus. The following chart illustrates the reliability task and the plant personnel that might be involved. When working with an integrated system, the focus shifts to a team approach, as the individuals involved are able to view the information in the manner most meaningful to each.

Process	Plant Personnel
Data Collection	Operators, Mechanics, Lubrication Techs
Data Analysis	Reliability, Operations, Maintenance
Information Dissemination	Reliability, Information Technology
Decision Making / Prioritizing	Reliability, Operations, Maintenance, Sales / Marketing

Systems Integration distributes the findings of the reliability program to decision makers within the plant. The following diagram illustrates an integrated reliability system where the internal (the reliability program ) is represented by the pyramid and the external (EAM/ERP/Control system).



## Internal Integration

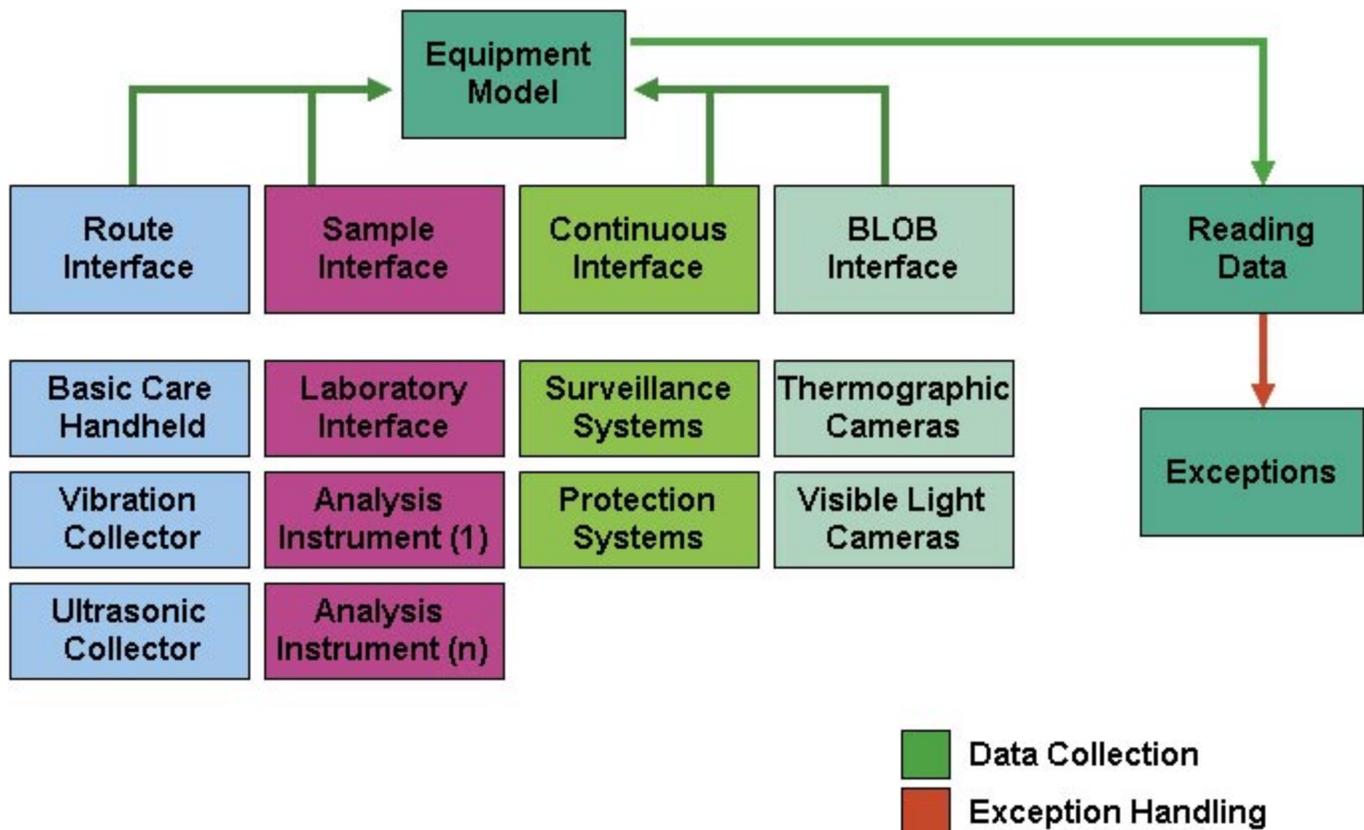
Internal integration brings multiple asset care disciplines together to present a cohesive view of the operating state of the asset. The advantages are:

1. Data Collection – an integrated system provides a single mechanism for gathering route-based, sample-based and continuously collected data.
2. Exception Handling – a single location is provided for viewing ALL alarms generated from the data collection process.
3. Data Analysis – there is a single set of diagnostic methods that allows for consistent analysis of data from multiple disciplines.

### Integrated Data Collection

Administering data collection from multiple sources of data requires the following capabilities from the central software being utilized:

- A single hierarchical data structure capable of handling all types of data (numerical, text, image, and vector data).
- The cross-referencing of the data collected to the corresponding date, collection meter value, sample id, speed/load factor, operator id, as well as other factors.
- The data structured to accommodate multiple data sources by having an alternate key identifier -“alias” – capability.

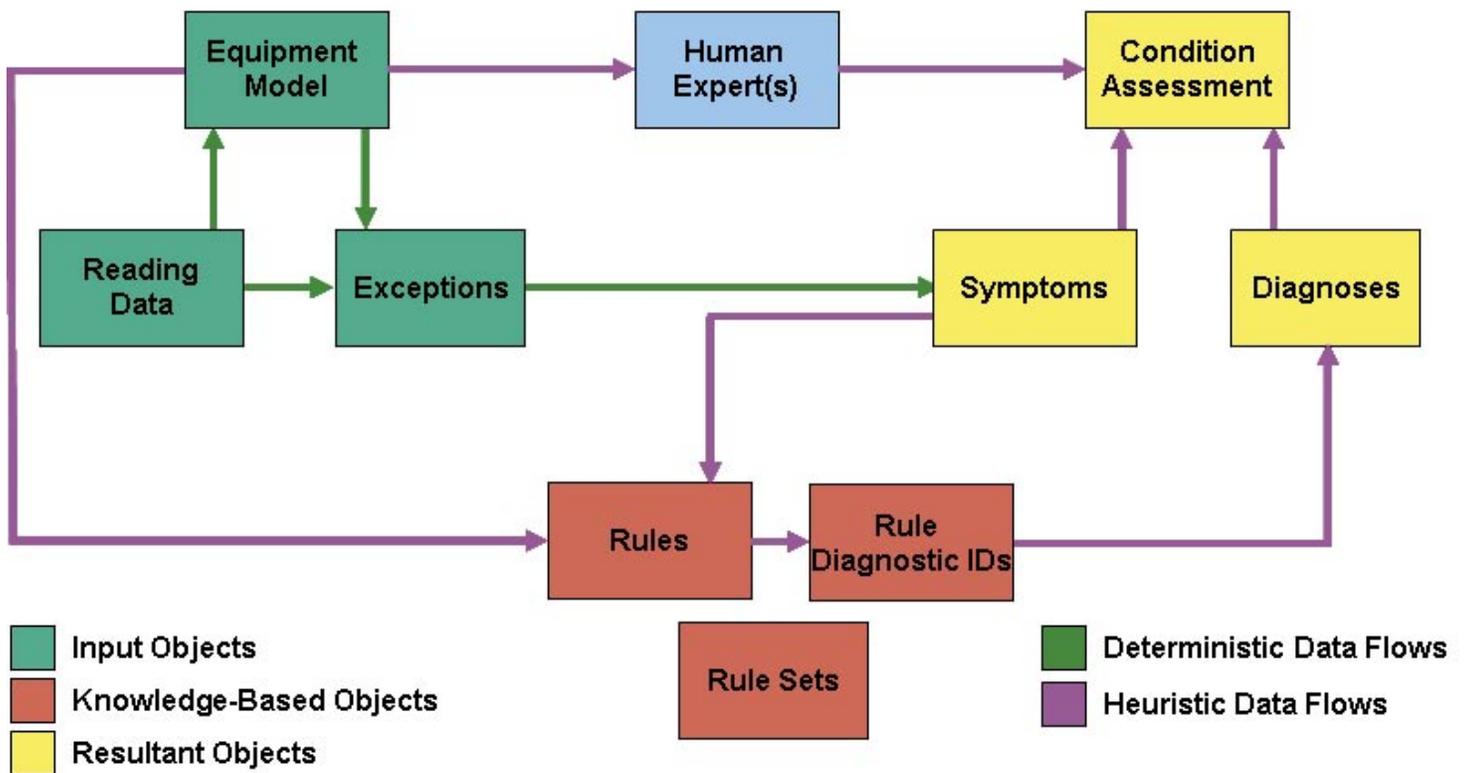


### Integrated Data Analysis

A common data analysis model requires a system with the following capabilities:

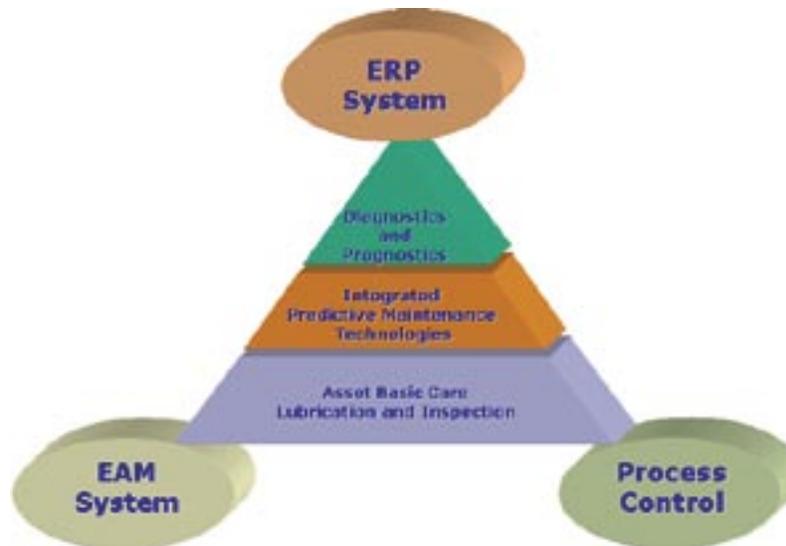
- The flexibility to manage exceptions from all monitoring / inspection data types.
- The ability to “drill down” through the exception to full data sets for the verification of an anomaly in the asset.

For the top level integration to occur, then an automated diagnostics system with integrated diagnostic tool such as an expert system or neural net that can access both exceptions and underlying data sets is required. It is essential whatever system is being used has the ability to save asset health evaluations, made by human expert or the diagnostic system, in a format that allows the evaluation to be recalled and reported in the future.



## External Integration

External integration involves exchanging reliability data with existing ERP, EAM and operations systems. External integration allows the sharing of key data through the plant in two areas.



1. The existing operations data display is integrated with the reliability program to allow operations to access condition / inspection collected data on their plant information systems.
2. The existing EAM/ERP system is integrated with the reliability program for workflow management information through a single mechanism managing condition and inspection-trigger work requests/ notifications in the EAM/ERP systems.

The following are two examples that illustrate both of these.

### **Example One: Operations Data Interface**

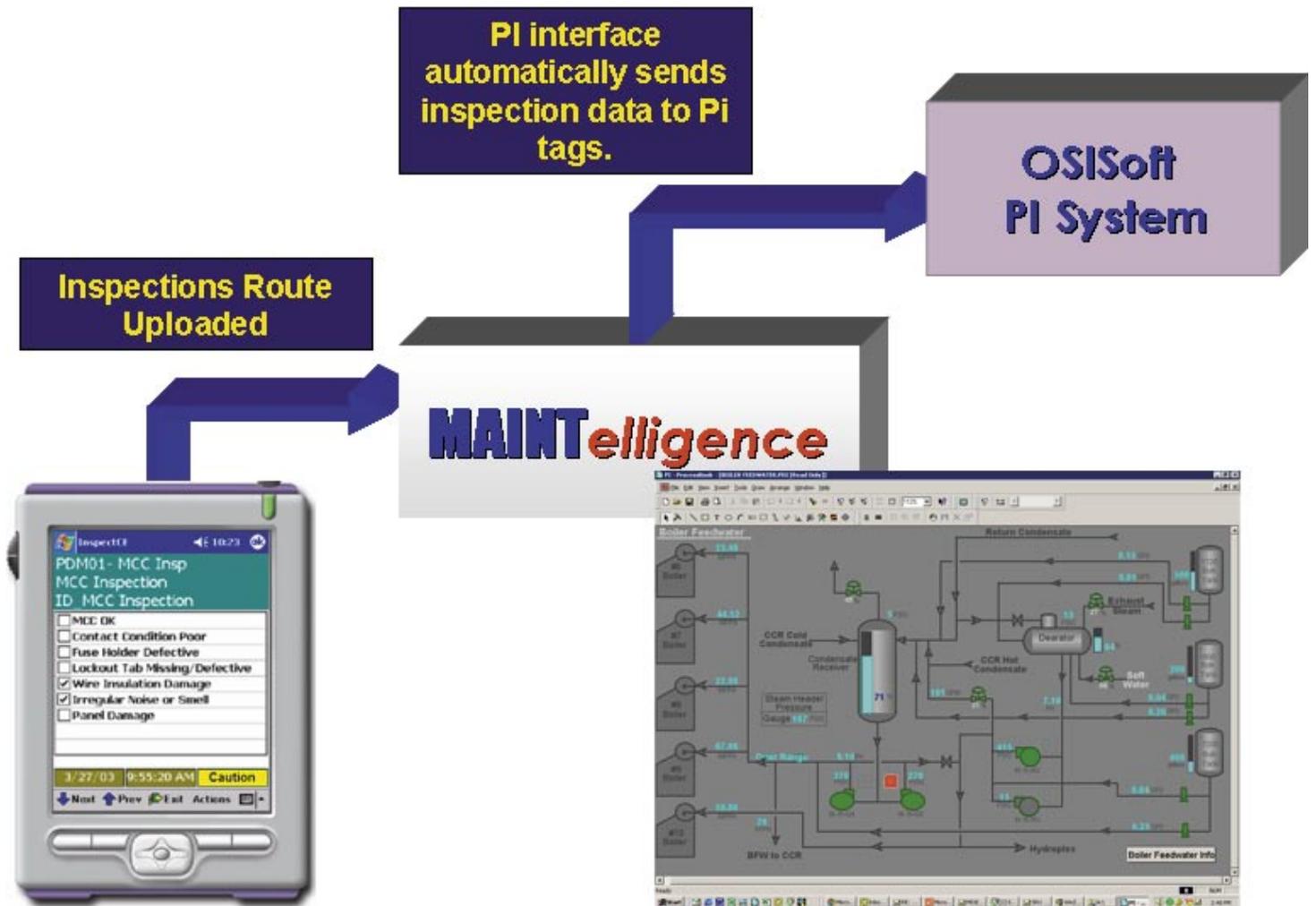
Implement An Operator Driven Basic Care Program, But Make It Fit In With Current Site Practices.

#### *Issue*

A key element of external integration is the ability to display basic care equipment status on PI operator screens.

#### *Resolution*

Implement an automatic interface that integrates data from integrated inspection system into the operations data flows in an OSIsoft PI system. Operations can determine the status of all plant equipment from the PI system, either from inspections or process control sensors.



**Example Two: Workflow Management**

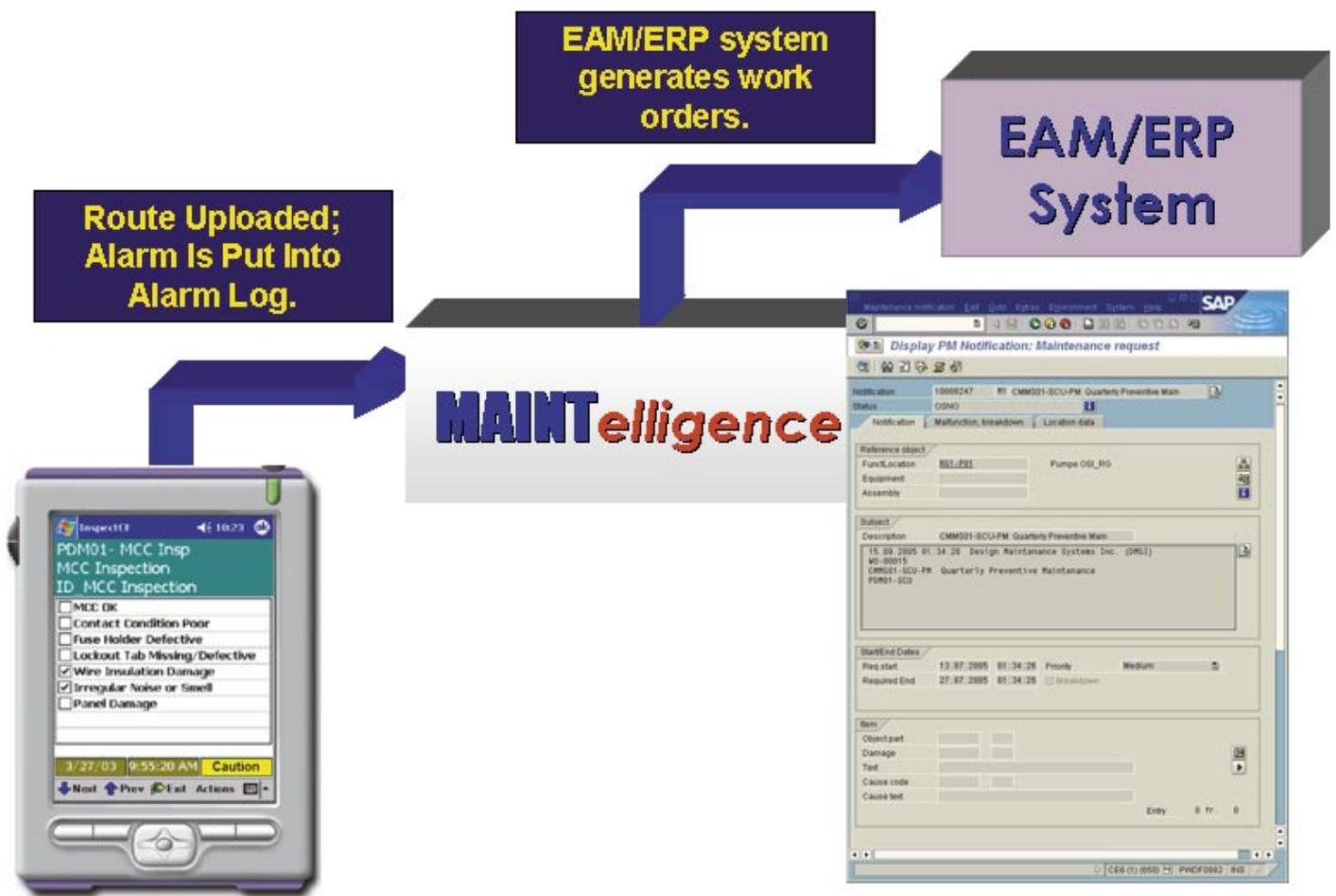
Communication between EAM/ERP System and Reliability System.

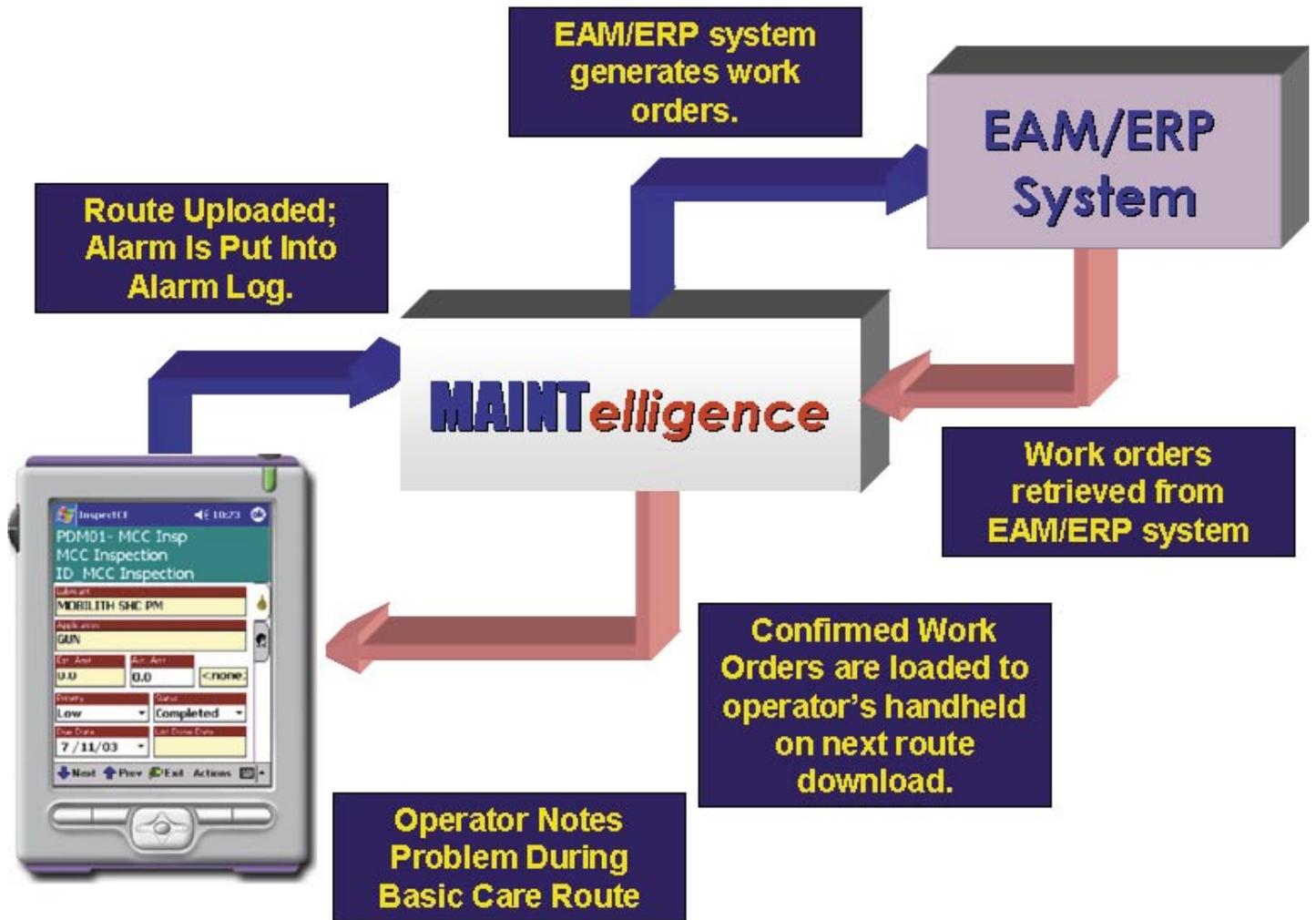
*Issue*

A key element of external integration are automated links between reliability systems and EAM/ERP systems.

*Resolution*

Implement an automatic interface that uses results from integrated reliability systems as triggers for work requests/notifications in an EAM/ERP system. Implement Feedback Loop from EAM/ERP system directly to operator's handheld devices.





**MAINTelligence** is a fully integrated reliability software - all the tools in one database and one software. For more information, please contact us at 1.800.923.3674 or email [info@desmaint.com](mailto:info@desmaint.com).