MANAGED SERVICES FOR MARINE APPLICATIONS

Marine - Industry Challenges
Challenge for marine industry is to understand the need of its customers, providing industry-leading marine services as well as experienced marine support services. As a marine operator, companies are subjected to rigorous regulation and economic challenges. This, coupled with rising fuel costs, is causing pressure on what are with already challenging margins.
Marine industry’s objective is to offer best possible updated technology for offshore services by adopting solutions that marine users to experience by proactive and predictive maintenance management practices.

ICT Enabled Managed Services for Marine Vessels

Pacific Controls has been recognized for developing various automation software and hardware, and deploying Global Control Command Centre (GCCC) for the ongoing commissioning of equipment and systems. Pacific Controls has been highly successful in implementing integrated automated solutions in the Government and commercial sector. Through its disruptive technology implementation the company has enabled customers to reap the benefits of remote control and integrated automation systems, and maximize the value of time-sensitive information.

Pacific Controls ICT enabled managed services model for marine industry and assist in bringing higher value driven marine industry space achieved by data unification and building an extensive model on top of it to deliver results as managed service format.

Pacific Controls integrate various marine vessel and shipping systems worldwide to enable services team receiving real time alarms, information, details and the data for the entire offshore portfolio.

Data Analysis at PCS Global Command Control Center

Adopting vendor neutral approach Pacific Controls in these projects integrate equipment using available possible interface. These integrations will be done at the site end and the critical data and information will be transmitted via cellular / satellite to central monitoring system to be processed by enterprise management software.

System Architecture

Pacific Controls has designed a unique cloud based solution where in controllers will be installed at site for marine vessel systems monitoring that will push the data over cellular / satellite to a Global Command Control Center. Global Command Control Center team will deliver the web-based solution to maintenance and support team and will maintain the application and hosting infrastructure. This architecture delivers an anytime anywhere access to operations and management team without dependency on a fixed PC in one location.

Following is the indicative system integration architecture while various components are shown that forms the schemes for Marine Vessels Integration.
The proposed monitoring system shows the listed marine vessel equipment parameters in one view and highlights any problems. The system also generates various useful informative reports. Users can be alerted at once if they are waiting to receive or need to fix something. The managed services are a bundle of applications used to implement multiple use cases.

## Value Proposition

Offered solution can deliver the following benefits to marine management team:

1. Integrates Marine Vessel Monitoring tool throughout the business ensuring single point of information.
2. Increases Marine Vessel health management and tracking operations efficiency through automation.

Galaxy will capture live information on operation, performance, efficiency of each marine vessel system and can help anticipate failure.

Such a solution yields immediate cost reductions in maintenance, optimizing resources on routine and non-scheduled interventions, as well as increasing uptime, bringing significant cost savings to ship owners.

### Key Features

- Keeps the track of Real Time Alarms/Alerts
- Active and non-active alarms can be easily distinguished
- Different users can be related to single or multiple facilities
- Each Alarm/Alert can have its Own Website links and Graphics Link associated with it that could help in troubleshooting an Alarm/Alert.

### GalaxyTM Expert Rule Engine System for FDD

The ever increasing complexity of business data systems is demanding a smarter, more intelligent means of fault detection and diagnosis. GalaxyTM solution meets this need with its expert rule engine system which dramatically reduces dependence on human intervention and minimizes error in fault analysis. Its ability to learn from experience ensures that no abnormal equipment behavior goes unnoticed.

Fault detection and diagnosis (FDD) is crucial to maintaining Asset management systems at their optimal performance and reliability. The GalaxyTM FDD modules provides proactive monitoring via the web in real time. It uses rule-based artificial intelligence to detect and identify faults, perform fault analysis and provide diagnostics reports. GalaxyTM FDD tools can actively simulate or test for faults under a complete range of operating conditions in order to understand faulty operation, what is causing performance to degrade, and identify broken components in a physical system.

### Key Functions

- Automatic collection and archiving of control systems data
- Providing a configurable expert rule engine system for fault and event analysis
- Managing performance metrics and monitoring KPIs, especially production and consumption
- Fine-tuning of equipment as part of the continuous commissioning process

The configurable rule engine is an expert system that captures the knowledge of a human expert by encoding it into a rule set. The artificial intelligence (AI) in the system is then able to perform in a similar manner to the expert. This allows the expert system to make decisions and take action automatically in real time.

The rule engine provides:

- Knowledge representation: The human calculations for diagnoses of a fault are translated into a declarative programming language.
- Segregation of data and logic: The rule engine separates the rule data into a central rule definitions repository.
• Configuration: with intuitive user interfaces for easy rule definition.
• Change management: ensuring rules are altered in a controlled manner.
• Self-learning: improving diagnosis over time through automatic learning.
• Reporting: faults detected are reported with a diagnosis.
The system can automatically take action to:
• identify a fault
• identify the causes of the fault
• identify degradation in the performance of equipment or systems
• provide advisory service and support information

Data Mining Application
The Data Mining tools can be used to identify patterns in data. They can apply a rules based analysis and a wide range of techniques including a number of different types of regression, neural networks and clustering to predict future trends. They offer a wide range of data visualization methods to aid decision making. There are modules for fraud detection and revenue assurance.

Galaxy’s powerful data mining tools allow predictive maintenance – when equipment performance starts to degrade an alert is raised so that the unit is serviced before a breakdown occurs.

Prediction and Regression Analysis
This capability is one of critical feature in Galaxy Information Management Delivery Systems inform of ability to predict values with reasonable accuracy. This is used for creating budgets or benchmarks for the present as well as the future. With the toolset available in Galaxy, it is possible to generate values for the future. With the predictive modeling engine, predictive tasks can be standardized and automated.

The predictive modeling engine will contain the following features:
• Iterative regression - Linear (with one breakpoint), multi-variant linear and polynomial regression. Once the model is saved, it is recalculated if a period of recalculations is defined.
• Baseline adjustment – To define targets.
• Output of regression equation as a library or as a calculated point.
• Creation of test dependent variables through simulated meters that support entry for future values.
• Manual inclusion/exclusion of data points to prevent skewing of model due to anomalous data.

Anticipated Benefits
M2M technologies is a key part as an emerging trend in which embedded smart devices are networked wirelessly, allowing devices to talk to each other as well as respond to instructions from a user. A management layer sits between the user, who sets general targets, such as the required data or a destination, and a complex monitoring system that interacts with the devices to achieve them.

Following stakeholders in the organization are beneficiary of Pacific Controls Managed Marine Services Solution:
- Operations and Engineering
- Finance and Commercials
- Customer Support Services
- Sales and Marketing
- Corporate Social Responsibility

By using its unique business model, Pacific Controls has broken the cost barriers to access the proprietary and legacy data from all the different equipment and systems that assist to measure, monitor, and control to deliver optimum operations model.