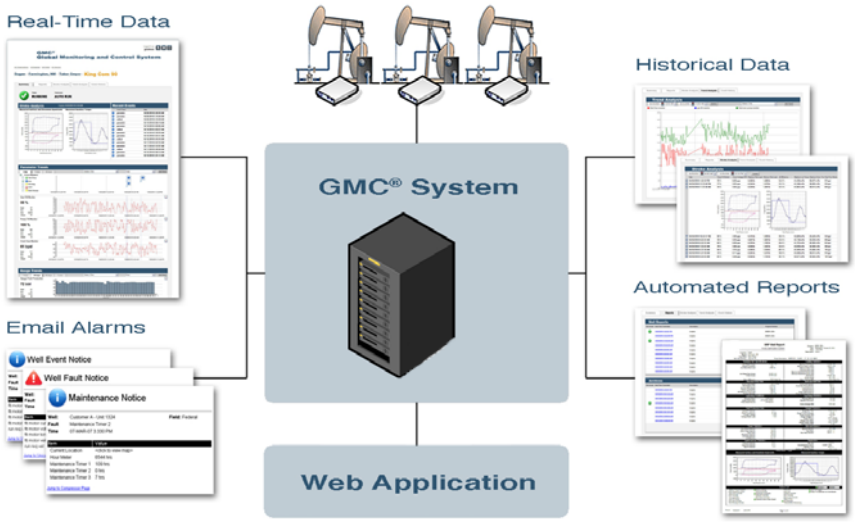
Solar Lighting International

GMC®

Global Monitoring and Control System



Overview

The GMC® system for enterprise monitoring and control is an efficient, cost-effective way for oil and gas producers to stay connected to the most critical aspects of daily operations. Using powerful hosted enterprise architecture, the GMC® system reduces time spent manually collecting and analyzing data. Operators can monitor multiple fields simultaneously from a standard Web browser or Internet-enabled mobile device. Personnel can be notified of faults and conditions automatically, even while away from a computer. Collected data is stored securely in a central database and is available through the same intuitive Web interface or exportable for use in third-party software. Other peripheral hardware can be integrated to provide a comprehensive solution.

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Real-Time Displays

The GMC® system continuously collects data from an unlimited number of wells and fields and makes that data accessible from virtually anywhere at any time over the Web. Real-time displays provide hierarchical navigation through the data, allowing the user to view a summary of all fields, all wells within a specific field, a single well, or to probe even further into specific parameters or other details. At each level, data is presented clearly and prioritized so that crucial issues are brought to the user's attention without having to scan every well in search of problems. Since data is collected constantly, trends can be viewed over time, revealing behavior that might otherwise go unnoticed by periodic examination.

Automated Well Reports

Comprehensive well reports can be generated automatically or on demand. SRP reports include both surface and downhole dynamometer graphs. Users can simultaneously compare current and historical well performance. By collecting, tracking, and trending well reports and centralizing report management, the GMC® system greatly simplifies field and well analysis.

Notification and Alarming

A sophisticated subscription service alerts users when specific conditions are detected. Notifications can be triggered, for example, whenever a fault occurs, when specific faults occur, when there is a communication failure, or when a value crosses a threshold, such as when production falls below a desired minimum. Alarms can be specified for individual wells or for an entire field. Users can customize alarm criteria and delivery options.

Overview *(continued)*

Mobile Data Access

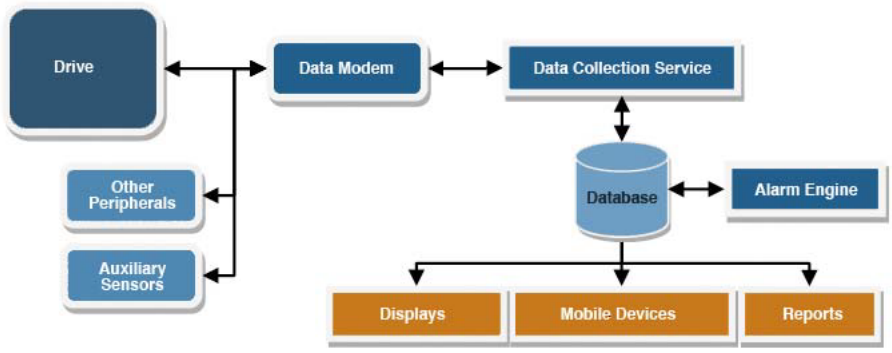
Mobile users can monitor the status of their wells and equipment from any location. Critical producer, field, and well content can be delivered to Web-enabled devices. Other devices can access select information via email or instant messaging services.

Sensor and Peripheral Support

Flexible GMC® data modems offer a host of features for interacting with external devices, including LAN, USB, and RS-232 communications as well as analog and discrete I/O. These capabilities extend system functionality by allowing monitoring and tracking of auxiliary sensor input and interfacing with external controllers.

Architecture

The GMC® system runs entirely on a host server. The server provides security, data collection, data storage, alarming, and notification services. The data modem provides a gateway between field equipment, such as drives and sensors, and the data collection service. Users access the real-time dashboard or mobile screens through the server's secure Web site.



Communication Options

A wide variety of communication hardware is supported, including cellular modem, Ethernet, Ethernet Advanced, local radio, and satellite.

Deployment Scenarios

The GMC® system can be deployed in a variety of configurations to meet both geographic and budgetary constraints. A clustered configuration, where multiple wells communicate via radio to a central cellular hub, maximizes use of cellular and satellite providers' unlimited data plans and allows operation outside of cellular coverage areas. A discrete configuration, using separate cellular modems on each well, simplifies field installation while allowing faster polling with asynchronous access.

Overviews

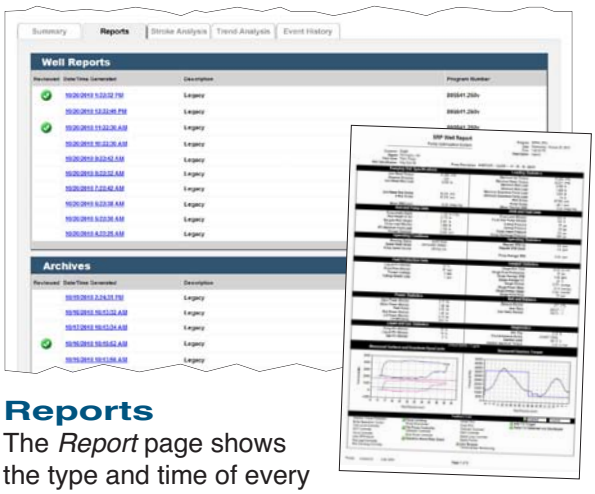
Dashboard/All Devices

The *Dashboard* (top) and *All Devices* pages (bottom) provide a quick overview of an organization's assets. The user can choose either display as their home page. The *Dashboard* shows the status of each device at a glance. Location and status detail is provided by hovering the cursor over the device name or status icon. The *All Devices* display provides more information about each device in tabular form. The user can select which columns are displayed. All devices can be viewed simultaneously or just those for a given organization, region, or field. Clicking on a device navigates to its *Summary* view.

Device Views

Summary

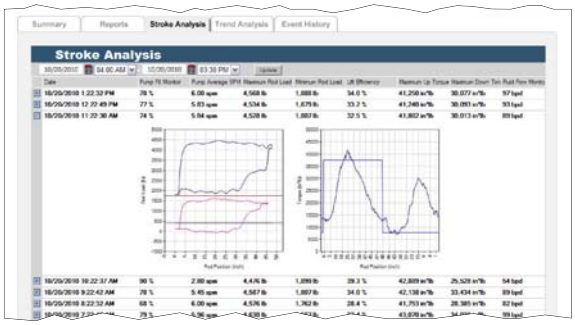
The *Summary* page provides a comprehensive overview of the selected device that includes its status, the most recent charts, a list of the most recent events, plots of real-time operating parameters with events clearly indicated on the timeline, and daily gauge information. The parameter and gauge trends are user selectable and feature selectable time frames. Users can quickly navigate to other wells in the same field or region by clicking the corresponding name in the header.



Reports

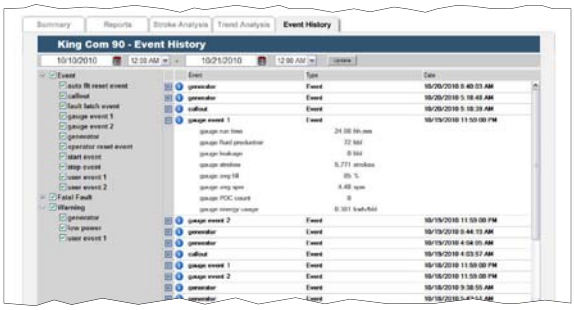
The *Report* page shows the type and time of every report collected from the device. Reports can be viewed, saved locally as PDF files, or printed directly from the Web page. The system also keeps track of which reports have already been viewed.

Device Views
(continued)



Stroke Analysis
The *Stroke Analysis* page displays all charts collected within a user-defined time span. Salient parameter data is displayed along with the chart. The type of charts available is dependent upon the device type.

Trend Analysis
The *Trend Analysis* page allows the user to plot and compare selected parameter values for the period of interest they specify.



Event History
The *Event History* page displays all events that occurred within a time frame that the user specifies. Other pertinent data, captured at the time the event occurred, can also be viewed. Filter options allow the user to control the types of events that are displayed.

Configuration

Subscriptions
The *Subscriptions* page allows the user to define which events and situations they would like to be made aware of should they occur. The system will monitor the selected conditions and notify a list of contacts by email of the event and any relevant data.

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